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HINTS AND POINTS FOR SPORTSMEN.

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CHAPTER I.

GUNS AND SHOOTING.

SECTION I.—THE SHOTGUN.

1. Choosing a Gun.—Select a gun according to your game. For wildfowl *only*, a 10-gauge, 9lb. gun, right barrel cylinder, left barrel choked; for wildfowl and smaller birds, select a lighter gun, preferably a 12-gauge, and if a novice, little choke is needed and more “scatter.” Get the best gun your purse will stand. A cheap gun generally makes a bad shot and a disgusted sportsman.

2. How to Carry a Gun.—The safest way is over the right shoulder, with muzzle pointing well up. The handiest way when game may be flushed is in the “hollow” of the left arm. Never carry it so that it points toward yourself, your friend or your dog.

3. Handling the Gun.—1st, Never in excitement nor in fun point it toward any human being. 2d, Never carry it so that if accidentally discharged it would endanger the life of a dog even. 3d, Always think, when walking, which way your gun is pointed, and if a companion is in the field with you, no matter how near and

how temptingly the game appears, do not shoot until you know just where he is, and that a stray shot may not possibly strike him, for one little pellet is sufficient to destroy an eye forever. 4th, Never get into a wagon without taking the cartridges from the gun. 5th, Never get over a fence without either taking the cartridges out or placing the gun through the fence on the ground, so that if you fall or the fence breaks it cannot be discharged. 6th, Always carry the gun at half-cock. 7th, Never let the hammers rest on the "plungers," or pieces which strike the cap. 8th, Never try to close it when the hammers are down. 9th, Never get in front of it yourself. If you see you are about to fall, drop the gun so the muzzle will be from you. Occasionally a cartridge will stick after it has been fired. A stout, thin blade of a knife will generally extract it, if not remove the other cartridge, and then cut a straight stick and poke it out from the muzzle; but even then do not place your body in front of it, but content yourself with using the hand. 10th, After firing one barrel take the cartridge from the other and examine the wad over the shot to see that it is not loosened by the concussion, as it very frequently is, which would produce a heavy recoil, and, if it gets up the barrel, will burst the gun, and likely take a hand off besides. 11th, Never take hold of the muzzle to draw it toward you, nor set it up, when, if falling, its muzzle would be toward you. Finally, follow all these suggestions and be self-possessed, and the fields will afford you sport without danger, and, I hope, without temptation.—*Hallock's Sportsman's Gazetteer.*

4. The "Fit" of a Gun.—Throw the gun to the shoulder as if to fire it. If the eye catches the center of the rib and the bead all right, the gun fits; if not, the stock is too straight or too bent. Another important point in "fit" is the length of the stock. You can't hit with an ill-fitting gun.

5. First Lesson in Learning to Shoot.—Go out by yourself where you can put up some object about the size of your hat, say some twenty yards away. Then take your position and commence to throw up your gun to your shoulder, and, keeping your eyes open, see how near you can bring the bead in line with your eye and the object at the instant that the butt-plate touches your shoulder. Try this a few times and then rest a few minutes. Then try again, but do not fatigue yourself. After you can throw the gun on to the mark with your eyes open, shut up both eyes and throw the gun to your shoulder in the same manner as before, and the instant that you feel the butt touch your shoulder open both eyes and see where your gun is pointed. Keep up this practice until you can throw your gun into line with any object that you may select, whether it is above, below or on the same level with your eyes.—“*Iron Ramrod.*”

6. Second Lesson in Learning to Shoot.—After you are perfected to a satisfactory degree in the practice of throwing your gun up to some object, take a piece of paper about two feet square, and with some tacks fasten it up on an old shed, barn or old building, where you will do no damage, and then step back twenty or thirty steps and load your gun, cock it and hold it in position with the muzzle toward the ground at an angle of about forty-five degrees. Fix your eyes on the target, shut both eyes and instantly throw up your gun and fire, keeping your eyes closed until after the discharge. If your practice has been faithfully performed before this you will probably find the paper riddled with shot, and if you do not you will readily see where the charge did strike, which will help you to remedy it at the next fire. When you can hit that paper (with a moderate degree of certainty) with your eyes closed you have more than “half the battle,” for you have mastered the “hang” of the gun, and the rest is comparatively easy.—“*Iron Ramrod.*”

7. Loading.—Shake powder down, then put a thin grease-proof wad on powder, then thick felt wad; on shot thin card board wad, and push firmly into position. For open pattern turn case full and firmly, for close pattern turn it only slightly. Be sure nothing comes in contact with the cap while loading.

8. Care of Guns.—Never let a gun remain dirty over night, no matter how much exertion it may involve. Swab it out first with warm soap suds, after which it should be wiped dry. Then it should be thoroughly rubbed with chamois skin or cotton flannel soaked in gasoline, turpentine, benzine or kerosene, which will remove any particles of dirt which may resist the water and soap. In addition to this, the penetrating qualities of these volatile oils are such that they sink into the pores of the metal and act as a rust preventive. The last operation is a good rubbing with dry chamois skin. If the gun is a comparatively new one, it should be kept in a dry room, and occasionally looked at and rubbed out with the dry chamois; if it has been in use some time and is pretty well permeated with oil, one rubbing out two or three days after cleaning will be sufficient. On the locks never use anything but the best sperm oil, and that sparingly.

9. Cleaning Rod.—Use a wooden cleaning rod. Jointed cleaning rods are handy to carry, but the metal ferrules are apt to scratch.

10. Cleaning a Foul Gun.—To clean a badly fouled gun insert a cork in the breech rather tightly; next pour some quicksilver into the barrel, shaking it about for a few minutes. The mercury and lead will form an amalgam and leave the barrel perfectly clean.

11. “Leaded” Barrels.—Saturate a rag with belmontyle oil and rub the barrels before and after using and when put away for the day. To remove leading, warm the barrels slightly and anoint with mercurial

ointment. This will form an amalgam with the lead. Then wipe out clean.

12. Cleaning Brass Shells.—Clean the outside of brass shells with a cloth and vinegar. Leave the inside dirty; it will hold the wad more firmly.

13. Gun Locks.—Don't meddle with them often. Use only sufficient oil to lubricate; if too much oil be used it will gum on the locks.

14. Oil and Dirt on Locks.—To remove gummed oil and dirt on gun locks, dip a tooth brush in benzine or naphtha and brush lightly.

15. Vegetable Oil.—Vegetable oil used on gun locks is liable to gum.

16. Oil for Stocks.—Use raw, not boiled linseed oil on gun stocks.

17. Rust.—Rust in gun barrels is ferric oxide, formed by oxygen coming in contact with the steel and settling around minute holes in its surface. If not at once eradicated these small rust spots will go on continually taking up oxygen and consuming the steel.

18. Rust Preventive.—Common beef tallow (without salt) is a capital rust preventive. Apply it with a flannel cloth.

19. Rust from Salt Air or Water.—To prevent gun barrels from rusting when hunting on or near salt water apply to them a light coat of thin shellac varnish.

20. Rust Protective.—In damp climates it is customary, in putting away guns for the close season, to plug up one end of each barrel and fill with melted tallow (free from salt), then wrap up in paper or cloth and set away as far from the ground as possible. To remove the tallow pour warm water upon the outside of the barrels.

21. Rust Eradicator.—Rust spots in barrels may be smoothed out with emery paste, made from three parts cosmoline, or oil, and one part emery. Use on a soft swab which fits the barrels closely. Then apply the wire scratch brush, and finally wash out clean.

22. Parts of a Gun.—Bolts—Irons which enter the loops or eyes of the barrel to fasten it to the stock. Bridle—A polished piece of steel which caps the tumbler, and is secured by screws; it also receives the sear screw. Butt of stock—The shouldered extremity of the stock. Cap—It covers the ramrod screw, but, of course, is obsolete in the breechloader. Casting-off—The outward inclination given to the butt of the gun, being intended to incline the line of the aim inward. Swivel—A small catch suspended from the neck of the tumbler to receive the extremity of the mainspring. Cock—This is more frequently called the striker or hammer. Escutcheons—Ornamental pieces of silver to prevent the bolts from defacing the stock when the turnscrew or pincers are applied; escutcheons are also used on other parts to receive initials, crests, shields, etc. False-breech—This receives the butt or nose of the breech when the barrel is fastened into the stock. Fence—The part between the cock and nipple which receives the solid cock. Guards—That which defends the triggers. Heel plate—The plate with which the butt of the stock is tipped. Lock-plate—Supports the principal works of the lock. Loops—Eyes on the outside of the forepart of the stock which receive the bolts that fasten the barrels to the stock. Mainspring—That by which the tumbler is worked with the cock. Nipple, or pivot—The small iron pillar that receives the copper cap; the latter, however, is obsolete in breechloaders. Pipes—Tubes to receive the ramrod; done away with, of course, in breechloaders. Rib—Central piece of iron which unites the barrels and receives the ramrod. Scroll-guard—An extension of the guard which receives

the right hand in firing the gun; it is now superseded by the pistol-handle stock. Scear—That which catches the tumbler for half or whole cock, on being pushed up by the trigger. Scear-spring—The spring which holds the scear in the notches of the tumbler at either half or whole cock. Side-screw—A screw which fastens on the locks. Sight—A patch of metal, usually of silver, placed near the gun barrel to direct the aim. Spring-cramp—A useful instrument to assist both in taking to pieces and putting together the parts of the gun. Tail, tongue, or finger—The neck, shoulder, or arch of lockhammer. Top-rib—This opposes the rib which unites the lower arches of the barrels; when it is very prominent behind, it is called the elevated rib. Trigger plate—The trigger works in it. Trigger springs—Are small springs met with in all locks, and are intended to keep the triggers close to the scear. Tumbler—The movable center-piece of a lock which falls with and is subservient to the cock. Tumbler-screw—This fastens on the cock. Vent hole—Used only in muzzleloaders, are intended to let out the gas, and are supposed to lessen recoil. Worm—The screw at the end of the ramrod; obsolete in breechloaders.—*Land and Water.*

23. Proportionate Charges.—Major H. W. Merrill has, after experiment, prepared the following table of proportionate charges for shotguns of different gauges, taking as a unit the charge of 3drs. powder and 1oz. shot for a 14-bore. The ratios, as will be seen, are constant quantities and may be readily used to construct other tables, and having more or less powder and shot according to fancy. Any other gauge and charge than 14 may be selected as a unit of measure. Having found the ratios, they are to be multiplied respectively by the charge of powder and shot contained in the charge you have assumed as correct (and the unit), this will give all the proportionate charges.

TABLE OF PROPORTIONATE CHARGES FOR SHOTGUNS OF 4 TO 16 GAUGE INCLUSIVE—TATHAM'S STANDARD SHOT NO. 6.

Gauge numbers.	Diameters of bores.	Areas of bores.	Ratios of the Areas.	Loads of powder, nearly. Drams.	Loads of shot, nearly. Ounces.	No. of pellets exactly.
4	1.08	9137	2.45	7 $\frac{1}{3}$	2 $\frac{7}{16}$	534
5	.99	7693	2.06	6 $\frac{1}{5}$	2 $\frac{1}{16}$	449
6	.93	6782	1.82	5 $\frac{1}{2}$	1 $\frac{7}{8}$	397
7	.89	6217	1.67	5	1 $\frac{13}{16}$	364
8	.85	5652	1.51	4 $\frac{1}{2}$	1 $\frac{1}{2}$	329
9	.82	5275	1.41	4 $\frac{1}{4}$	1 $\frac{7}{16}$	307
10	.79	4398	1.31	4	1 $\frac{5}{16}$	286
11	.76	4521	1.21	3 $\frac{2}{3}$	1 $\frac{3}{16}$	264
12	.73	4176	1.12	3 $\frac{1}{3}$	1 $\frac{1}{8}$	244
13	.71	3956	1.06	3 $\frac{1}{5}$	1 $\frac{1}{16}$	231
14	.69	3736	1.00	3	1	218
15	.67	3516	0.94	2 $\frac{4}{5}$	1 $\frac{5}{16}$	205
16	.65	3228	0.86	2 $\frac{3}{5}$	1 $\frac{4}{16}$	188

24. Shells.—Should fit the chamber in length as well as diameter.

25. Pattern.—It is impossible to fix upon any one pattern as a standard by which to gauge the shooting qualities of individual guns, because of so wide a diversity in the degree of choke. We have, therefore, selected the two extremes—a cylinder bore and a very full chokebore—and give below such patterns as good guns of each class should make. Between the two limits of 110 for cylinder and 240 for extreme choke most sportsmen will probably find their records to accord with the divergence of their guns from these two bores. A cylinder bore gun loaded with 1 $\frac{1}{2}$ oz. No. 7 shot should put 110 pellets into a 30-inch circle at 40 yards. An extreme chokebore gun, loaded with 1 $\frac{1}{4}$ oz. of No. 7 should put 240 pellets into a 30-inch circle at 40 yards. A good chokebore, such as we prefer for general shooting, should put between 180 and 200 pellets into the same circle under the same conditions. There is a golden mean in pattern. While a gun that drives its shot packed like a bullet requires sure aim,

and a big score with it counts more than with a scattering chamber, the game is terribly mutilated and butchered.

26. Targets for Cylinder and Chokebore Guns.—A cylinder bore loaded with 1½oz. No. 7 shot should put 110 pellets into a 30-inch circle at 40 yards. An extreme chokebore gun, loaded with 1½oz. of No. 7 shot should put 240 pellets into a 30-inch circle at 40 yards. A good chokebore, for general shooting, should put between 180 and 200 pellets into the same circle under the same conditions. The patterns given above are with the following charges of powder:

Twelve-Bore.		Ten-Bore.	
Pounds.	Drams.	Pounds.	Drams.
6½ to 7	2½ to 3	7¾ to 8	3½
7 to 7½	3 to 3½	8 to 8½	3½ to 4
7½ to 8½	3½ to 4	8½ to 9	4
		9 to 10½	4 to 5

27. Pattern Tests.—To ascertain how close and even your gun shoots, obtain a number of sheets of manilla paper, on each of which draw a circle 30 inches in diameter. Then at 40 yards' range and a fixed rest find out the number of shot you can put into the circle, using each time a different load, varying the amounts of powder and shot, respectively, the make of powder, number of, and kind of wads, etc. When you have discovered the best load, stick to it always, unless pattern is obtained at the expense of penetration. It is advisable, too, to increase penetration by reducing the charge of shot or increasing charge of powder. One pellet, sent with sufficient force, will kill where half a dozen may hit, but without enough force to penetrate to a vital point. When three-fourths of the number of shot in a charge can be put into a 30-inch circle at 40 yards the gun shoots close enough for ordinary work. When the guns are tested in the open air a sheet of paper 4 feet square at 40 yards should receive the charge, and a 30-inch selected circle marked out on it after every shot. A stationary circle

marked on the paper before it is shot at, is only good for trials held in a long shed or building, where no wind and draughts of air can deflect the loads from striking exactly in the ring.

28. Penetration Test.—To test penetration with varying loads, get a long, narrow box; saw through both sides at intervals of one inch or less, thirty or more places, into which place as thick pasteboard as will fit. Knock out the end of the box toward you, and blaze away at the broadside of the pasteboard at 40 yards' range.

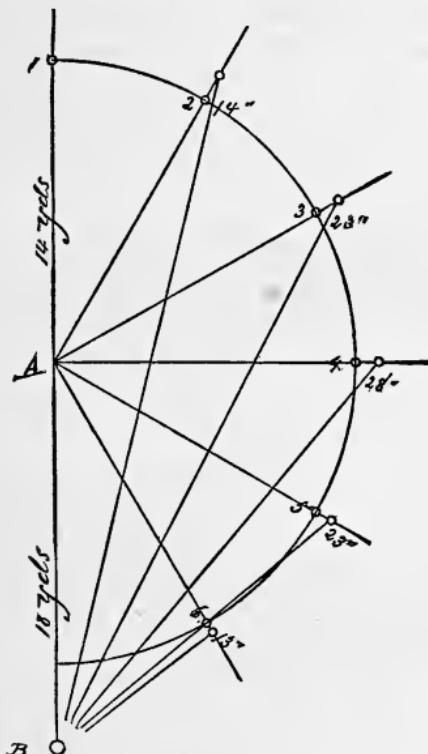
29. Increasing the Shot Charge.—By increasing the amount of shot a better pattern is obtained, but at the expense of penetration.

30. Practice Shooting.—Load the same when shooting for practice as when in the field.

31. Aiming Practice.—Throw your gun to the shoulder, take aim at an object with both eyes open, and then close the left eye to ascertain if the gun be bearing directly on the object aimed at.

32. "Holding Ahead."—Major W. McClintock, R. A., made some experiments in England (results published in the *Journal of the Royal United Service Institution*) which demonstrated that a charge of $4\frac{1}{2}$ drams best C. & H. powder gives to No. 4 shot a muzzle velocity of 1,344 feet. Inferior powder would, of course, give less. The time of flight for a velocity of 1,300 feet is: 30 yards, .093; 40 yards, .1342; 50 yards, .1797; 60 yards, .2311, etc. This will about equal the velocity usually obtained from a 10-bore with $4\frac{1}{2}$ drams of good powder and $1\frac{1}{2}$ ounces of No. 4 shot. A bird crossing the line of fire at 30 yards distance (flying at the rate of a mile a minute) would pass over about $8\frac{1}{2}$ feet while the shot passes through the 30 yards. At 40 yards the bird would cover about 12 feet, at 50 yards about 16 feet, and at 60 yards the bird would cover about 22 feet.

33. Aiming at Flying Targets.—The same laws which rule in the case of clay birds are applicable to live ones, and if the idea of just how to aim at the trap could be well impressed, the shooter would in consequence become more expert in the field. The solution of the question of how to aim ahead is a mathematical one. If the velocities of shot and bird and the distance of the bird



from the shooter at the time of firing are known, then the gun must be held at a certain point in order that the center of the load and the bird may meet. The velocity of No. 8 shot is put down at about 800 feet per second. The velocity of clay-pigeons with the trap set in the fourth notch is about 35 feet per second, $\frac{1}{23}$ as fast as that of shot. In other words, while shot were moving 23 feet

the clay bird would move 1 foot. The accompanying diagram will give an idea of how far to hold ahead for the various angles a bird takes in leaving the trap. Let the trap be at *A* and the shooter at *B*, and the angles be taken for each 30 degrees which correspond with the 12 notches in the Ligowsky pigeon trap. *A* 1 is a dead away bird, and if it is not caught dodging, a man with average skill can easily demolish it when it reaches the summit of its flight by holding hard on. Earlier the aim must be a little above and later a little below the bird. Next take *A* 4 which leaves the trap on a line at right angles to the shooter. Let us suppose that when the shooter is ready to fire, the bird is 14 yards from the trap, and the position of the shooter is 18 yards from the trap. The distance of the bird from shooter is *B* 4, or say 68 feet. While the shot would be traveling to *A* 4 the bird would move on the line *A* 4 nearly 3 feet further, and while this 3 feet was being traveled by the shot the bird again moves nearly 2 inches. The amateur who has aimed at the bird gets a nice "goose egg" for his pains. The apparent position of the bird now, as viewed by the man at the score, is approximately 28 inches to the right of the point where seen at the instant of firing. By the same calculation we obtain that the aim must be ahead for the angles as follows: At 2, 14 inches; at 3, 23 inches; at 5, 23 inches, and at 6, 13 inches. These calculations assume that the bird moves on a line straightaway from the trap, which is not always the case. They frequently make a turn to right or left, and this trick of theirs must be watched closely and aimed for accordingly. For instance, it is easy for a bird which leaves the trap on the line *A* 2 (see diagram) to start on a curve to the left about the time the shooter is beginning to press on the trigger, and in a very short time it becomes a straightaway bird and must be shot at. Or should it turn to the right the lead must be increased in order to hit it. Allowance must also be made for ascending and descending motion of the birds. And windage is

no trifling factor, and if high, with the successful shot, is always taken into account. It is probably the hardest of all to deal with, and on a windy day the crack shots generally have to make excuses for their low scores. Of course, when the word "pull" is given, and the bird is seen to take its course, the shooter has no time to figure out the thing exactly. There is business to attend to and that quickly, or the thin brick-colored chap will be seen to settle in the grass without the loss of a scale. A glance and a thought is all there is time for, and the situation must be taken in at once. That this can properly be done, this thing of shooting ahead must previously be well fixed in the mind. Success cannot result without it, and the sooner the shooter properly comprehends it, the sooner will he become a fair if not a crack shot.—*W. L. P.*

34. Shoot With Both Eyes Open.—Learn to shoot with both eyes open. You can see better with two eyes than with one, and the open-eyed hunter is not apt to be a pottering shot.

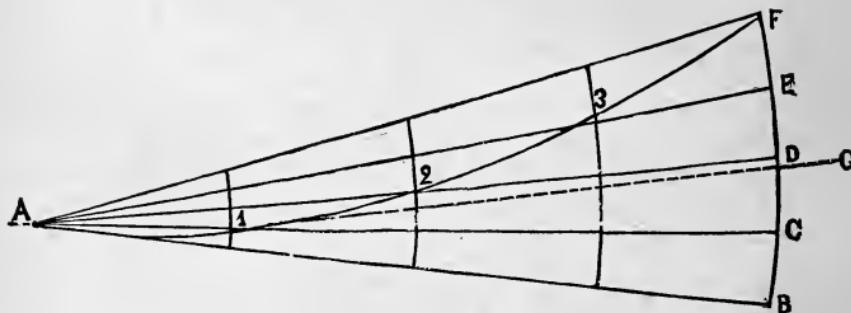
35. Sight in Aiming.—In aiming at an object nothing should be seen except the gunsight and the object. If the top of the barrel or rib of the gun is seen you will shoot over your game. The sight should appear to be at the breech end of the barrels.

36. Distance in Shooting.—Learn to measure distance by the eye. Practice by estimating and then pacing it off.

37. Shooting at Moving Target.—Hold your gun with left hand well along the barrel. Learn to shoot with both eyes open.

38. Aim at Flying Game.—Some light may be thrown upon the questions of whether to aim at or in front

of a bird crossing the shooter by consideration of the accompanying figure and its explanation. A is the position of the charge when fired, and B that of the bird at the same instant, the latter being supposed to fly from B to F in exactly the same time that it takes the former to go from A to $B F$, the bird's line of flight. If the aim is along $A F$ with the gun temporarily at rest, the bird passing B at the instant of firing, then the charge strikes the bird at F ; if along $A B$, with the gun at rest, the bird will reach F as the charge reaches B ; if the aim is along $A B$ at the instant of discharge and the gun continues to be held on the bird in its flight toward F , the conditions are those of



the question principally requiring consideration. Suppose now that the line $A B$ represents an indefinitely extended gun barrel, fired in the position $A B$ and swung around with uniform velocity from the instant of discharge, so that when it gets into the position of $A F$ the charge reaches the muzzle at F , then when the barrel is in the position $A C$ the charge will be at 1 ; when in $A D$, at 2 , and when in $A E$, at 3 . The points $1, 2$ and 3 are those of the curved line through which the charge has to pass from A to F . Returning to the original conditions: If $A 1$ represents the length of the gun barrel (held on the bird flying from B toward F after being fired with aim along $A B$) the charge leaves it at 1 and flies in the straight

line for 1 G, which is the resultant of the forward and angular forces and tangent to the curve at 1, and is therefore outside of the path required to carry it to F. If any other point of the curve A 1 2 3 F is taken as the muzzle of the gun, the breech being at A in all cases, the result shows the charge crossing the bird's line of flight somewhere between B and F at the same instant that the bird reaches F, and palpably chronicles a missing shot behind the bird. Such successful shots as seem to argue false theory in the foregoing, can generally be accounted for without disturbing it. In some cases the scattering of the shot serves to cover the error in aiming, and in others the gun is discharged just as it "catches up with" the bird, and while it is moving with a rapid angular velocity unintentionally and accidentally correct.—*Coroho*.

39. Recoil.—Recoil is the retrograde motion impressed upon a piece by the pressure resulting from the expansive force of the gases generated by the explosion of the charge of powder. It begins at the moment of the ignition of the charge.

40. Velocity of Shot.—Prof. T. M. Rice, of the U. S. Naval Academy, deduced the following from experiments with a 12-gauge gun, 30-inch barrels, weight $7\frac{1}{2}$ pounds:

Powder.	Drams.	Size of Shot.	Ounces.	Range in feet.	Mean Velocity in feet per second.
H	$2\frac{1}{2}$	2	$1\frac{1}{4}$	50	1,013
H	$2\frac{1}{2}$	2	$1\frac{1}{4}$	100	865
H	$2\frac{1}{2}$	2	$2\frac{1}{4}$	100	854
D	3	7	$1\frac{1}{8}$	100	776
D	3	7	$1\frac{1}{4}$	100	783
D	3	7	$1\frac{1}{4}$	50	855
H	$2\frac{1}{2}$	2	$1\frac{1}{4}$	50	995

If we assume the mean velocity of shot for 40 yards to be 800 feet per second, the time of flight will be 1.115

seconds. A bird flying at the rate of 60 miles an hour goes at the rate of 88 feet per second, or 13.2 feet in 0.15 seconds. Again, if we assume the mean velocity of shot for 40 yards to be 1,000 feet per second, the time of flight will be 0.12 seconds, and the distance traversed by the bird, 10.56 feet. Ducks, when going at full speed, attain a velocity exceeding 60 miles an hour; it would therefore seem that an allowance of 10 or 15 feet, in the case of a duck passing a point under full headway, is not too much, if the distance equal or exceed 35 yards. In the case of most double guns the elevation of the rib at the breech is more than sufficient to compensate for the distance through which the shot will fall in going 40 yards. A sight one-tenth of an inch in height, at 30 inches from the eye, will exactly cover a line 4 inches in length at a distance of 100 feet. The elevation of the rib of most double guns is greater than one-tenth of an inch.

On this subject Prof. Alfred Mayer, of the Stevens Institute of Technology, made some exhaustive experiments from which he deduced the following table:

I. 10 COLT GUN, 5DRS. CURTIS & HARVEY POWDER, 1 $\frac{1}{4}$ OZ. SHOT.

Size of shot.	Vel. 30yds.	Vel. 40yds.	Vel. 50yds.
No. 1 buck.....	1153	1067	...
FF.....	1147	1132	...
BB.....	1146	1126	...
No. 3.....	1066	1015	928
No. 6.....	1012	963	859
No. 8.....	995	880	775
No. 10.....	908	803	716

II. 10 COLT GUN, 4DRS. CURTIS & HARVEY POWDER, 1 $\frac{1}{4}$ OZ. SHOT.

No. 1 buck.....	1067	1018	
FF.....	1017	1009	967
BB.....	1000	967	897
No. 3.....	989	911	872
No. 6.....	966	883	806
No. 8.....	920	874	776
No. 10.....	848	756	669

III. 12 COLT GUN, 3½DRS. CURTIS & HARVEY POWDER, 1½OZ. OF SHOT.

No. 1 buck.....	...	...	...
FF.....	...	...	...
BB.....	862	795	667
No. 3.....	844	754	696
No. 6.....	825	739	600
No. 8.....	816	749	607
No. 10.....	796	680	610

IV. 12 COLT GUN, 4DRS. CURTIS & HARVEY POWDER, 1¼OZ. OF SHOT.

No. 8.....	847	722	671
No. 10.....	784	657	596

A noticeable feature of the above is the rapid increase in the velocity from No. 10 up to No. 3. With the heavier pellets the increase is less marked.

41. Velocity of Shot in Different Gauges.—The larger the gauge the better the penetration with a given load, because the same charge occupies less length in a large gauge than in a small one, hence there are fewer pellets in contact with the barrel in the former than of the latter to oppose by their friction the projectile force of the powder. Also, the powder in a 10-gauge is exploded nearer the center of its volume, and thus does not have so much chance of blasting before it unburnt powder contained in the portion of the charge removed from the point of ignition. Experiments made by Prof. Mayer give the relative penetrations of the 10 to the 12-gauge about as 9 is to 7.

42. Hold the Butt Firmly.—The moment when the recoil commences coincides exactly with the moment of the initial movement of the projectile, therefore, the butt of the gun should be firm against the shoulder when the trigger is pulled.

43. Shiny Powder.—Powder that shines is dirtier than dull powder, and leaves a residue in the barrels.

44. Too Much Powder.—To ascertain if your charges contain more powder than your gun will burn, lay a number of sheets of white paper on the ground, say 10 or 15 feet along from the muzzle of the gun, and then, having a determined load, fire it, and so catch the grains of unconsumed powder on the paper.

45. Buckshot in Cylinder Bores.—If it is desirable to shoot buckshot from a cylinder bore, such size should be selected as will chamber loosely in the bore—loading them in layers—three layers, with three shot in a layer. If it is desirable that they should scatter, place a card wad between each layer; if close shooting is desired, pour melted tallow over the shot after they are arranged in the shell.

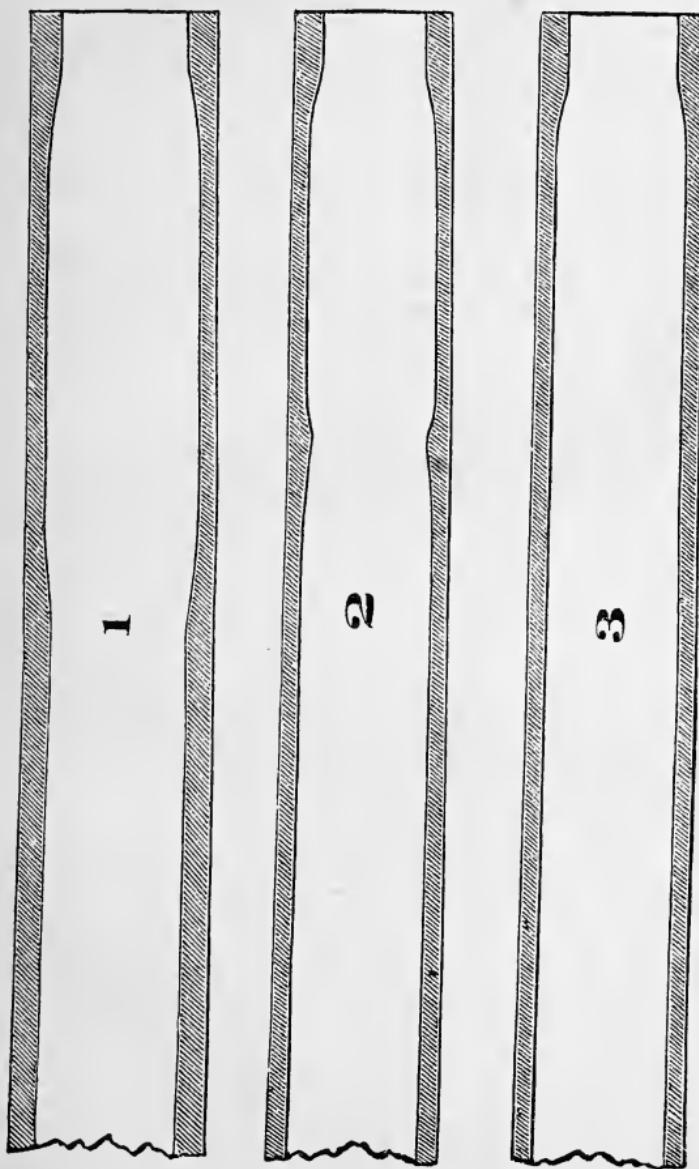
46. Buckshot and Ball in Chokebores.—Bullets, buckshot and all shot larger than No. 1 should not be discharged from a chokebore. Ball *may* be shot from some chokebores a thousand times without injury; but there is *always* liability of jamming and no one can tell when it may occur. To use buckshot in a chokebore, when you are willing to risk consequences, place a wad in the muzzle and press it down to the point where the choke is closest. Then by chambering the shot on the wad there determine the proper number to use in a layer in the shell.

47. Wire Cartridges.—They may be used in a cylinder bore for long range shots, but do not give good results when used in a chokebore.

48. Tight Wads.—A tight wad over the shot makes the shot scatter.

49. To Make a Gun Scatter.—To make a shotgun scatter, divide the shot charge into three or four portions and place a card wad between each portion.

50. Chokebore.—The term “chokebores” means simply “barrels whereof the diameter of the bore at the



muzzle is less than the bore at some point behind the muzzle, other than the chamber," while any barrel constricted at the muzzle to the extent of $\frac{5}{1000}$ of an inch, may be termed a modified choke. A full choke is constricted to the extent of $\frac{30}{1000}$ to $\frac{40}{1000}$ of an inch; but the larger the bore, the greater must be the muzzle. The constriction of the bore must be from $\frac{1}{2}$ to 1 inch from the extremity of the barrel; this constriction if placed 3 inches or more from the muzzle, fails to throw the shot close together, but will give better penetration than a cylinder bore.

51. Large Gauge.—A gun of large gauge will carry more shot than a smaller gauge, and with practically an equal force; hence, at short range, chances of killing are greater with a large gauge.

52. Crook of Stock.—Generally a tall person or one with long arms needs a gun with a long and crooked stock, and *vice versa*. A too straight stock makes a gun shoot high; a too crooked stock makes it shoot low.

53. Length of Barrels.—The shorter the barrel the greater the range of divergence of the charge. Long barrels shoot closer than short, and will kill game at greater distance. For quick shooting, and cover shooting, 26 to 28 inches is about right in a 12-bore; 2 inches more in a 10-bore. Short barrels should be charged with a finer grain of powder than longer ones.

54. Balance of Gun.—The center of gravity should be from 26 to 27 inches from the heel of the butt, just forward of the guard. *

55. Cooling Heated Guns.—Open or "break" the gun and allow the air to pass through the barrels.

56. "Pull" of Triggers.—Triggers should have from 4 to $4\frac{1}{2}$ pounds pull.

57. Loose Shot in Cartridges.—If you have shot the right barrel two or three times and do not want to shoot the left, take the left cartridge out and put it into the right barrel, and put the fresh cartridge in the other barrel.

58. Holding Wads in Place.—Use a good, firm, stiff pasteboard wad, under which place a circular disc of cotton cloth large enough to come up over the edge of the wad and project above the same, say from a sixteenth to an eighth of an inch. To load, first lay the disc of cotton centrally over the mouth of the shell or loading tube, a good, stiff pasteboard wad exactly on top in the center and drive it home. Or, fasten your cardboard wad centrally to the larger cotton or thin cloth disc with a touch of good flour paste. Having thus prepared a lot of them, should you prefer a lubricant, take an even roll of them, dip the projecting cloth edges in a little melted tallow, you then have a lubricant exactly where you want it, in advance of the charge of shot.

59. Vise for Guns.—If you put your gun in a vise use a wooden one. If you can't use a wooden vise, join two pieces of flat pine or bass-wood by a leather strap at one end, and set in the iron vise with the strap down, in shape of a letter **U**.

60. To Color Stocks.—Put 4 ounces of alkanet root into a half-pint of raw linseed oil. When the oil becomes a bright red wet a sponge or rag in it and go over the stock four or five times. Be sure that the wood absorbs the oil each time.

61. To Color Stocks Brown.—Dissolve a few crystals of permanganate of potash in water, and rub well into the wood.

62. Varnish for Stocks.—Coach varnish, made quite thin with turpentine, and put on lightly, makes a good finish for gun stocks.

63. Measuring Gun Stocks.—Lay a straight-edge along the rib, as shown in the cut, extending to the butt of



the stock; measure at points 1 to 2, 3 to 4 for the crook, and from the front trigger to the butt for the length.

64. Gauge Numbers.—A round ball, ten of which will weigh a pound, will exactly fit the barrel of a 10-gauge gun. The size of ball "eight-to-the-pound" fits an 8-gauge gun, etc.; hence the derivation of the numbers expressing the gauge of shotguns.

65. Powder Measure.—The term "dram," by which charges of powder are measured, is an arbitrary quantity, and bears no relation to avoirdupois, troy or apothecaries' weight, although it is probable that the dram of powder originally weighed the same as the dram avoirdupois.

66. Browning Gun Barrels.—1 ounce muriate tincture of steel; 1 ounce spirits of wine; $\frac{1}{2}$ ounce muriate of mercury; $\frac{1}{2}$ ounce strong nitric acid; $\frac{1}{2}$ ounce blue stone; 1 quart water. Mix well, and allow to stand thirty days to amalgamate. After the oil or grease has been removed from the barrels by lime, the mixture is laid on lightly with a sponge every ten hours. It should be scratched off with a steel wire brush night and morning until the barrels are dark enough; and then the acid is destroyed by pouring on the barrels boiling water, and continuing to rub them until nearly cool. If the barrels are of laminated steel do not dilute the acid so much.—*Greener.*

67. Sizes of Shot.—The appended table gives the number of pellets in an ounce of the various makes mentioned. When the number is not given the size is not made.

SIZE.	Merchants Baltimore, Md.	Tatham Bros. New York.	Tatham's Chilled.	Tatham's Chilled Trap.	T. O. Leroy & Co. New York.	T. Sparks, Philadelphia, Pa.	Walker & Parker English Shot.			
							Pellets.	Pellets.	Pellets.	Pellets.
TTTT	22	24	24	24	27	27	24	27	22	22
TTT	26	27	27	27	31	31	31	32	27	27
TT	30	31	31	31	35	35	39	39	33	33
T	34	36	36	36	41	41	46	38	38	40
BBB	39	42	43	43	49	49	51	42	46	50
BB	45	50	52	52	58	58	60	51	53	58
B	52	59	61	61	69	69	71	60	62	75
1	60	71	73	73	82	82	90	71	75	82
2	77	86	88	88	102	102	100	88	92	112
3	94	106	109	109	98	98	118	107	118	135
4	115	132	136	136	125	143	159	134	146	177
5	140	168	172	172	157	187	237	170	172	218
6	180	218	223	223	209	267	299	223	246	280
7	225	291	299	299	245	286	317	285	296	323
8	365	399	409	409	495	400	515	509	407	434
9	610	568	585	585	716	560	715	700	585	596
10	1130	848	868	868	1130	842	1098	1103	866	854
11	2200	1346	1346	1346	1345	1826	1826	1378	1414	1414
12	3200	2326	2326	2326	1963	2918	2918	2384	2400	2400
13	12200	...	...	...	...	...	...	...	...	...

68. "Don't."—Don't point your gun at yourself. Don't point your gun at any one else. Don't carry your gun so its range includes all your hunting companions. Don't try to find out whether your gun is loaded by shutting one eye and looking down the barrel with the other. Don't use your gun for a walking stick. Don't throw your gun into a boat so the triggers will catch and deposit the charge of shot in your stomach. Don't use your gun for a sledge-hammer. Don't carry your gun with the hammer down. Don't be a fool. Don't you forget it unless you have serious intentions of leaving this mundane sphere.

SECTION II.—THE RIFLE.

69. Hunting Rifle Qualifications.—(1) safety; (2) strength, durability and ease of manipulation; (3) killing power and penetration; (4) flat trajectory; (5) portability; (6) freedom from recoil; (7) finish and ornamentation.

70. Loading.—If in loading the bullet is not inserted in the shell, but is pushed into the grooves in the barrel so as to be about $\frac{1}{30}$ inch in front of the shell, the ball will take the grooves perfectly, and the blotting paper patch will not be cut by the shoulder of the chamber, giving practically the same result as a muzzleloader.

71. Rifle Shooting.—Hold the butt firmly against the shoulder (close to the body), not on the muscle of the arm. Extend the left hand along the barrel, and hold it firmly with the fingers. The elbow should form a very obtuse angle. Press the trigger with a steady pull, but do not jerk or twitch it.

72. Practice in Aiming.—The great desideratum in off-hand shooting is practice. If practice may not be

had upon the range, good results may be attained by aiming a rifle in a room at a small object or a spot upon the wall, and snapping the hammer.

73. Aiming the Hunting Rifle.—The sight (using open sights, permanently set to 100 yards' range) should be coarse very near the piece (within 8 yards), changing to fine at 8 yards, which is the near point blank; then to very fine at 55 yards, which is the point of greatest error, from this to fine at 100 yards, the true point blank, and beyond the range, coarser and coarser, the further the object is off. Different rifles produce different errors, but I find these differences to be very small at this short range. They will all fall between $1\frac{1}{2}$ and $2\frac{1}{2}$ inches, which is the greatest error at 55 yards. This includes the military, long range, mid range, express and all good hunting rifles, which I suppose to be well loaded. There are two methods of aiming the rifle among sportsmen: One by changing the sight taken from fine to coarse and *vice versa*, and the other by not changing the sights, but by aiming higher or lower on the object. Which of these modes is the best I will not pretend to decide; each has its advocates. For myself, I never vary the sight, but aim higher or lower as the case may require.—*Major H. W. Merrill.*

74. Keep Barrel Clean.—Accurate shooting depends upon perfectly clean barrels. Wipe out the barrel after each shot, if possible.

75. Target Shooting Makes Slow Hunters.—The great drawback to off-hand shooting on rifle ranges is that it makes a pottering, slow shot on game. The shooter takes his time at the range, knowing the target cannot get away, and hence doesn't learn to get a quick aim.

76. Powder for Rifle.—Powder for rifle shooting should be the cleanest obtainable. Dirty powder causes foulness and leading, hence bad shooting.

77. Rifle Bullets.—The increase of length of bullets is attended with a decrease of initial velocity, but up to a certain point with an increase of mean velocity, while the steadiness of flight and penetration are always improved. The longer the range the heavier will be the bullet that will give the flattest trajectory, and this is more marked at extreme ranges than at moderate ones. A bullet that will give the flattest curve at one range will give a higher curve than a heavier bullet at a longer range. Having fixed the range at which we wish to obtain the flattest trajectory, it is simply a matter of calculation as to what weight of bullet will give the best results with a fixed caliber. To illustrate: Suppose that we have fixed on a .50-caliber rifle with a powder charge of 5 drams or 138 grains. On this assumption one may calculate the weights and other data of the bullets giving the flattest trajectory at the respective ranges. The results are shown in the following table, in which the weights of the bullets are given to the nearest 10 grains. It may be well to add that if we increase the powder charge, the weight of the bullet corresponding to the flattest curve will also be increased, but not in the same ratio.

TABLE.

Range, Yards.	Weight of bullet, Grains.	Time of flight, Sec.	Initial velocity, f. s.	Remaining velocity.	
				At end of range.	At 400yds.
100	320	0.171	1989	1562	922
200	350	0.388	1931	1249	941
300	390	0.647	1865	1075	963
400	430	0.947	1803	981	981

The last column is added to show what the remaining velocity would be in each case, if the flight were continued up to 400 yards, and is only given for the sake of comparison. By common consent 200 yards seems to be the range fixed upon for which the flattest trajectory is

required. Therefore, if the flattest trajectory were the only object to be gained we would accept the 350-grain bullet as being the most effective. But there are other conditions to be fulfilled even more important than a flat curve. These are accuracy and energy. Both of these conditions are obtained by the same means, *i. e.*, by increasing the weight of the projectile. Thus we are obliged to sacrifice trajectory to a certain extent dependent on the use to which the rifle is to be put, the extremes being the hunting rifle shooting the round ball, and the long-range rifle shooting an elongated projectile of from 3 to 4 calibers in length.

78. Bullet Metal.—The best proportion for bullets is twenty parts of lead to one part of tin; harder bullets would possibly do better shooting, but the wear and tear on the rifle grooving would be much increased. Patched bullets give better results than grooved; but the latter, well lubricated, serve all practical purposes. The best and most convenient lubricant is beef tallow—pure in winter, but for summer mixed with $\frac{1}{2}$ beeswax.—*Calumet*.

79. Heavy Bullets for Small Calibers.—“Devil’s Ramrod” in *Forest and Stream* gives the following method of moulding bullets for sportsmen who use small caliber rifles for large game: 1st, Melt sufficient lead to make nine bullets, and mould them without any special care as to accuracy. 2d, Clean the ladle out, put the nine bullets therein, and place over a moderate fire. 3d, While they are melting fill the mould with quicksilver, and as soon as the bullets are melted pour the quicksilver into the ladle and stir rapidly with a piece of clean iron. 4th, Remove from the fire and mould nine bullets from this alloy. Pour the remainder into a tin pan or upon a piece of wood. Repeat the process until you have the desired number of bullets, pouring out the residue as above directed, each time; for if it is allowed to remain in the ladle, the proportion of quicksilver will

be gradually increased and ununiform shooting will result. When you are through, take this residue, place in the ladle, melt and use. The lead must not be allowed to get too hot, as quicksilver volatilizes rapidly when exposed to red heat. The result of these directions will be a bullet of slightly greater weight than one of pure lead, and not lighter, as when alloyed with tin, and besides possessing a fine degree of hardness, will retain its shape better when fired through hard substances, and naturally has better penetration. The following simple algebraic formula will give the weight of a bullet made of the above mixture: Sp. grav. of lead = 11. Sp. grav. of quicksilver = 14. Let a = weight in grains of bullet made of pure lead, b = weight of the mould full of quicksilver, and c = weight of resultant bullet.

$$\text{Then: } b = \frac{a}{11} \times 14, \text{ and } c = \frac{a \times 9 + b}{10} - .09 \times 10.$$

80. Recoil in Rifles.—1st, Recoil commences with the first motion of the ball, and continues until it leaves the barrel. 2d, The resistance of the atmosphere being in proportion to its velocity, or the velocity of the object coming in contact with it, it follows that whatever increases the speed of the ball through the barrel will increase the recoil. 3d, As more force is required to produce a fast motion of a ball than a slower motion, it follows that all circumstances, such as quick powder, large charges, etc., that are capable of causing increased velocity, are likewise capable of causing increased recoil. 4th, The weight of the ball governs the tendency to recoil to a great extent. 5th, The weight of the gun in excess of that of the missile is the great regulation of recoil. 6th, That the barrel is moved by recoil before the ball leaves it. 7th, The line of the barrel being above its parallel extended from the breech, where it rests against the shoulder, would cause its point to rise with a recoil, and if from any cause a greater recoil is produced than provision has been made for in adjusting the sight, it must

result in an elevation of the range of the ball. Hence we have "over-shooting" with heavy loading.—*J. F. P.*

81. Windage Allowances in Rifle Shooting.—

This table shows approximately the divergence at from 100 to 1,000 yards for winds blowing across the plane of fire:

	200 yards.	300 yards.	1,000 yards.
Gentle wind (4 miles per hour)....	3in.	10in.	3ft. 6in.
Moderate wind (10 miles per hour)	5in.	1ft. 6in.	7ft.
Fresh wind (20 miles per hour)....	7in.	2ft. 6in.	11ft.
Strong wind (35 miles per hour)...	9in.	3ft. 6in.	16ft.
Very high wind (50 miles per hour)	1ft. 1in.	5ft.	21ft.
A gale (80 miles per hour).....	1ft. 4in.	7ft. 6in.	30ft.

82. Line of Sight.—"Line of sight" is the straight line from the eye, passing through the bottom of the crotch sight, taking in the tip of the bead sight, and thence straight on, piercing the target in its very center.
—*Major Merrill.*

83. Trajectory.—"Trajectory" is the curve described by a rifle ball from the barrel muzzle, which is beneath the line of sight, up through the line of sight, and for some distance above it, then down through the line of sight again, to the center of the target.

84. Point Blank —"Point blank" is the second point where the trajectory of the ball in its flight intersects or cuts the line of sight. The first point of intersection is sometimes called the "first point blank," or "near point blank."

85. Point Blank Range.—"Point blank range" is the straight line or shortest distance from the piece to the second point blank (or in practice to the target whose center is struck at this point). The French and Americans use the same point blank, but in the British service it is different; their point blank distance is "the distance at

which the projectile (ball) strikes the level ground on which the carriage stands, the axis of the piece being horizontal." (Col. Scott's Mil. Dic.)—*Major Merrill.*

86. Point Blank.—The position of a firearm when the axis of the bore and the object aimed at are in the same plane, which may be either parallel or inclined to the horizon.—*Glossary of Military Terms.*

87. Point Blank.—The point at which the line of sight intersects the trajectory. Strictly speaking, the line of sight intersects the trajectory at two points, but in practice the second intersection only is considered. This distance is called the point blank distance. The natural point blank corresponds to the natural line of sight. All other points blank are called artificial points blank.—*Benton's Ordinance.*

88. Point Blank.—By point blank I mean the distance to which your rifle will shoot over the 50 yard sight, so nearly level that the drop of the ball need not be taken into account.—*T. S. Van Dyke.*

89. Shot in Rifles.—Don't shoot shot in rifles, as they will catch the rifling and go off in all directions.

90. Powder Ignition.—From experiments made in 1884 by Mr. James Duane, loading .45-caliber government shells (U. M. C.) capped with Berdan No. 1 primers, with different quantities of sand behind the powder charge, he determined that the flash of a Berdan No. 1 primer penetrates the powder in an ordinary rifle shell less than $\frac{1}{8}$ of an inch.

91. Bluing Barrels.—Tincture of muriate of iron, 1 ounce; nitric ether, 1 ounce; sulphate of copper, 4 scruples; rain water, 1 pint. First, securely plug up both ends of barrels, leaving one plug in each end of sufficient length to be used as handles, then thoroughly clean with soap and water, after which cover with a thick coat of

lime, slacked in water, and when that has become dry remove it with an iron wire scratch brush; this is to remove all dirt and grease from the barrels. Then apply a coat of the fluid with a rag, and let it stand for twenty-four hours, when a slight rust will have appeared; then take barrels and immerse them in a trough containing boiling hot water, after which scratch them well with the scratch brush. Repeat this until the color suits, which will be after three or four applications. When completed, let the barrels remain in lime water a short time to neutralize any acid which may have penetrated. Take great care not to handle the barrels during the operation, for the least particle of grease will make bad spots.

92. Pistols.—It is best to use in pistol practice the same weapon which would be likely to be used in case of necessity; practice with .22-caliber gallery pistols affords only amusement and is of no practical value. In selecting a pistol, choose a heavy one, for the weight is necessary to counteract the recoil or "kick-up." The charges used in the .32 and many of the .38-calibers are out of all proportion to the weight of the weapons, and it is therefore impossible to do accurate shooting. The .41-caliber is a convenient and effective size, but the ball in it even is too heavy and causes excessive recoil. The writer has tried No. 2 buckshot in this caliber in place of the regular conical bullet, and, although the recoil was reduced to the minimum, it was at the expense of penetration.—*Calumet.*

93. Range of Revolver.—A good revolver will carry 40 yards straight and kill. The heavy army and navy pistols will kill at 100 yards or even further.

94. Pistol Practice.—In pistol shooting the range was formerly 12 paces, or 12 yards, the regular dueling distance. This has now been increased up to 20 paces; and with Colt's revolvers matches have been shot at 50

yards. The position adopted in New York galleries is that shown in the cut, and the targets are the regular 200



yards target reduced proportionately. Those generally used are $8\frac{5}{8}$ in. \times $5\frac{3}{4}$ in.; inner, $5\frac{5}{8}$ in.; center, $3\frac{1}{4}$ in.; bullseye, $1\frac{1}{6}$ in. They can be purchased at any New York pistol gallery at 25 cents a hundred.

CHAPTER II.

GAME, HUNTING AND TRAPPING.

95. Game in General.—The best time of day for hunting all kinds of game is early morning or late afternoon. Extremes of temperature are unfavorable; a still, cloudy day being the best. A wet day is often good. A well-watered country, part hilly, part marsh, part level, part meadow, part wooded, is the ideal territory for game birds of all ordinary species.

96. All-Round Gun.—A double gun of 12-gauge, $7\frac{1}{2}$ to 8 pounds in weight, modified choke, is about right for an all-round gun. If much duck hunting is to be done a 10-gauge, $8\frac{1}{2}$ -pound gun is better; but in the field or cover an 8-pound gun will weigh 12 pounds by nightfall.

97. All-Round Rifle.—Probably no caliber is better adapted to all kinds of American large game shooting than the .45; but the .40-caliber is large enough for the shooting of most men, and the .40-caliber does not require to be so heavy that it is burdensome. The bone-crushing power of the .50-caliber is immense, and if one wants to be “loaded for bar” it is just the rifle to have; but the experienced hunter will not lug about a rifle of 10 or 12 pounds to shoot deer, antelope, wildcats and turkeys.—*Calumet.*

98. Hunting Clothes.—The hunting suit should be of a dull, neutral tint, drab, gray, or “dead-grass” color, and should be of good, stout material to withstand briery thickets and rock climbing.

99. Manners in the Field.—1st, Always be polite and unselfish. 2d, Drink little or no liquor. 3d, Never let your gun point toward yourself or anybody else, whether it is loaded or not. 4th, No matter how easy to get over a fence, through a hedge, or into a boat, see first that your gun is at half-cock. 5th, If you take down bars put them up again. 6th, Walk abreast of your associate, never ahead or behind. 7th, If separated from your companion, don’t shoot unless he is in sight. 8th, Give your fellows a chance to shoot as well as yourself when your dog stands. 9th, If a rising bird flies more in your companion’s direction than in your own, wait till he shoots before you blaze away. 10th, Never shoot toward your companion, no matter how far away he may be. 11th, Don’t give orders to your friend’s dog. 12th, When both of you shoot, and the bird falls, don’t swear that you killed it. 13th, Don’t lie about your exploits.

100. Hunting in Company.—When in company be sure of the position of your companion. Better lose a bird than shoot a friend.

101. Carrying Gun.—When carrying a gun, barrels should rest on the shoulder, muzzle well up; or else under arm, the muzzle pointing to the ground, two feet ahead of you.

102. Fence Climbing.—Never climb a fence with a loaded gun in your hands. Either remove the shells or carefully set the gun over the fence first, then climb it a few yards away, so that if you fall you won’t knock the gun down, and perhaps explode the charge.

103. Dog.—Always keep your dog in sight when

hunting birds. If "treeing" partridges (ruffed grouse), however, with a spaniel, this is not necessary, as the spaniel will bark when he has treed the game.

104. Wind.—The wind should blow from the game toward the hunter.

105. Trespass.—Look out for trespass signs before shooting or fishing in a strange place. Never leave a gap in a fence or wall you may have to get over.

106. Powder.—Use the best powder you can get, if it does cost a little more. The difference in the shooting will more than repay you. Besides, poor powder injures gun barrels, causing them to rust in spots.

107. Smokeless Powder.—Setting aside the question of penetration and efficacy, it is better to use smokeless powder (wood powder) in the first barrel, where it is expected a second shot will be often required.

108. Home-Cut Wads.—If you cut your own wads, cut the powder wads from soft, spongy, clear leather, and lubricate them well with tallow and plum-bago. Shot wads may be cut from pasteboard.

109. Loads for Grouse Shooting.—In the early part of the season No. 6 shot is good for grouse; later, say in November, you will want No. 4, for grouse will carry away a big load of fine shot, and seemingly mind nothing about it.—*Iron Ramrod*.

110. Charges for Small-Gauge Guns.—For 14, 16 and 20-gauge guns, and for medium and small game, load with $2\frac{1}{4}$ to $3\frac{1}{2}$ drams No. 1 (fine) powder, and 1 ounce shot for 14-gauge; $2\frac{1}{2}$ to 3 drams No. 1 powder and 1 ounce shot for 16-gauge; and $2\frac{1}{2}$ to $2\frac{3}{4}$ drams No. 1 powder and $\frac{1}{2}$ ounce to 1 ounce shot for 20-gauge.—*D. W. Cross*.

111. Charges for 10-Gauge Guns.—1st, For large game, such as deer, turkey, geese, etc., use $3\frac{1}{2}$ to $4\frac{1}{2}$

drams of No. 1 (fine) and No. 3 (coarse) powder, mixed half-and-half, with two pink-edged wads or one felt wad over the powder, and 1½ to 1¾ ounces shot, from No. 1 to BBs inclusive, with one Baldwin wad over the shot, the wads in metallic shells to be two sizes larger than the gauge of the gun; in paper shells one size larger if metallic moulds are used in loading, to prevent the bulging and enlargement of the paper shell. 2d, For medium-sized game, such as canvasbacks, mallard, redhead, dusky ducks, widgeon, gadwall, pintail and birds of that class, when in full plumage: 4 to 4½ drams of fine and coarse mixed powder, as in No. 1, and same kind of wads; with 1½ to 1¾ ounces shot, from No. 5 to No. 2 inclusive, using your judgment in choosing about the proper size of shot for the kind of shooting, whether canvasback, etc., on points, or mallard, etc., over decoys. 3d, For small game and birds that usually lie close, such as snipe, woodcock, plover, gallinule (rail), pinnated and ruffed grouse, teal, summer ducks, etc.: 4½ to 4¾ drams mixed powder, as in No. 1, wads the same, with 1½ to 1¾ ounces of shot, from No. 9 to No. 6 inclusive, judging always which is the proper sized shot for the work in hand, say 9s and 8s for snipe, woodcock, etc., and 7s and 6s for grouse, etc.—*D. W. Cross.*

112. Charges for 12-Gauge Guns.—1st, For shooting large game: 2½ to 3 drams of mixed powder, Nos. 1 and 2 (Oriental, for instance), one pink-edged or felt wad over the powder, and one Baldwin over the shot (in all small gauges two wads over the powder increases the recoil, and adds but a trifle, if any, to the penetration and pattern), with 1 ounce of shot, from No. 1 to Bs inclusive. 2d, For medium-sized game: 3 to 3½ drams powder (mixed 1 and 2), with 1 ounce of shot from No. 5 to No. 2 inclusive. 3d, For small game and close-lying birds: 3½ to 4 drams mixed powder (Nos. 1 and 2) and 1 ounce shot from No. 9 to No. 6 inclusive.—*D. W. Cross.*

113. Table of Charges and Patterns.—The charges in appended table are for a gun bored for general shooting, and will give good results at the various kinds of game mentioned. The patterns are those which should be made by the same gun, in a 30-inch circle, at 40 yards, with Chicago chilled shot:

	FOR 16-GAUGE GUN.	Patterns.
Woodcock.....	2½ drs.	7/8 oz. No. 10 485
Snipe, quail and plover.....	2½ drs.	1 oz. No. 9 390
Prairie chicken (Aug. and Sept.)....	2½ drs.	1 oz. No. 7 210
Prairie chicken (Oct., Nov. and Dec.)	2¾ drs.	1 oz. No. 6 155
Ruffed grouse.....	2½ drs.	1 oz. No. 8 285
Squirrels and rabbits.....	2½ drs.	1 oz. No. 6 158
Teals, pintails, etc.....	2¾ drs.	1 oz. No. 7 210
Mallards, canvasbacks, etc.....	3 drs.	7/8 oz. No. 4 85
Geese and brant	3 drs.	7/8 oz. No. 1 40
Turkeys.....	2¾ drs.	7/8 oz. No. 2 52
	FOR 12-GAUGE GUN.	
Woodcock.....	3¼ drs.	1 oz. No. 10 510
Snipe.....	3¼ drs.	1½ oz. No. 9 405
Quail and plover.....	3½ drs.	1½ oz. No. 9 395
Prairie chicken (Aug. and Sept.)....	3½ drs.	1½ oz. No. 7 220
Prairie chicken (Oct., Nov. and Dec.)	4 drs.	1½ oz. No. 6 158
Ruffed grouse.....	3½ drs.	1½ oz. No. 8 300
Squirrels and rabbits.....	3½ drs.	1½ oz. No. 6 160
Teals, pintails, etc.....	3¾ drs.	1½ oz. No. 7 218
Mallards, canvasbacks, etc.....	4 drs.	1½ oz. No. 5 115
Geese and brant	4 drs.	1 oz. No. 1 45
Turkeys.....	4 drs.	1½ oz. No. 4 95
Deer (cylinder bore only).....	4 drs.	3 layers of buckshot.
	TRAP-SHOOTING.	
Live pigeons (wild).....	4 drs.	1½ oz. No. 7 205
Live pigeons (tame).....	4 drs.	1½ oz. No. 8 295
Clay pigeons.....	3½ drs.	1½ oz. No. 8 300
	FOR 10-GAUGE GUN.	
Woodcock.....	4 drs.	1½ oz. No. 10 525
Snipe, quail and plover.....	4 drs.	1¼ oz. No. 9 415
Prairie chicken (Aug. and Sept.)....	4 drs.	1¼ oz. No. 7 225
Prairie chicken (Oct., Nov. and Dec.)	4½ drs.	1¼ oz. No. 6 168
Ruffed grouse.....	4 drs.	1¼ oz. No. 8 305
Squirrels and rabbits.....	4 drs.	1¼ oz. No. 6 172
Teals, pintails, etc.....	4½ drs.	1¼ oz. No. 7 223
Mallards, canvasbacks, etc.....	4½ drs.	1¼ oz. No. 5 120
Geese and brant.....	5 drs.	1½ oz. No. 1 48
Turkeys.....	4½ drs.	1¼ oz. No. 4 160
Deer (cylinder bore only).....	5 drs.	3 layers buckshot.

TRAP-SHOOTING. Patterns.

Live pigeons (wild).....	4½ drs.	1¼ oz.	No. 7	220
Live pigeons (tame).....	4½ drs.	1¼ oz.	No. 8	303
Clay pigeons.....	4½ drs.	1¼ oz.	No. 8	305

114. Table of Chamberlin Charges. — The Chamberlin shotgun cartridges for game shooting are loaded according to the following table; first quality with A. A. Co.'s Ducking powder and pink-edge wads; second quality, black-edge wads:

GAME.	Gauge.	Powder. Drams.	Shot. Oz.	Size and Kind of Shot.
Sora, Rail, etc.....	12			
	16	2½	¾	10 Trap
	20			
Woodcock	10	4	1½	10 Shot
“	12	3½	1	10 Shot
Snipe.....	10	4	1½	9 Shot
“	12	3½	1½	9 Shot
Quail.....	10	4	1½	8 Trap
“	12	3½	1	8 Trap
Prairie Chicken.....	10	4½	1½	8 Shot
“	12	3½	1½	8 Shot
Ruffed Grouse.....	10	4½	1½	7 Trap
“	12	3½	1½	7 Trap
Squirrel.....	10	4½	1½	6 Shot
“	12	3½	1½	6 Shot
Teal.....	10	4½	1½	7 Shot
“	12	3½	1½	7 Shot
Pintail.....	10	4½	1½	6 Shot
“	12	3½	1½	6 Shot
Mallard.....	10	4½	1½	5 Shot
“	12	3½	1½	5 Shot
Redhead	10	4½	1½	4 Shot
“	12	3½	1½	4 Shot
Canvasback	10	4½	1½	3 Shot
“	12	3½	1½	3 Shot
Turkey.....	10	5	1½	2 Shot
“	12	3½	1½	2 Shot
Goose.....	10	5	1½	BB
“	12	3½	1½	BB

115. Charges for 6-Gauge Guns. — 1st, For large game: 4½ to 5 drams No. 3 (coarse) powder and 1½ to 1¾ ounces shot from No. 1 to treble SG, using two pink-

edged wads or one felt wad over powder and one wad over shot, two sizes larger than gauge of gun. 2d, For medium game: 5 to 6 drams of No. 3 (coarse) powder and 1½ to 2 ounces shot, from No. 8 to No. 2 inclusive, wad the same as in No. 1.—D. W. Cross.

116. Chilled Shot.—Chilled shot will often go clean through game, where soft shot would only go half through. But a wound from chilled shot is likely to close up, while soft shot will make an open wound that is sure death. Chilled shot is thought by some people to wear out the choke in a gun very rapidly.

117. Flight of Birds.—The process of normal flight may be considered to be due to two influences—the muscular effort of elevation, and the muscular relaxation of sliding down an inclined plane, which view may tend to simplify the explanation ventured on. When the bird flashes down the wing at *A* (Fig. 1), the body is thereby



FIG. 1.—UNDULATORY COURSE OF FLIGHT.

raised to a higher level at *B* than the end of the previous slope in the air, and at the next step the wings are held out horizontally while descent is begun down a short inclined plane, *BC*, where they have become relaxed, and are now pointed upward. On arriving here another flash



FIG. 2.—ALTERNATE ACTION AND REACTION OF THE WINGS IN FLIGHT.

of the wings is made downward, and the bird rises to *D*, at the summit of the next slope, when again the wings are

extended horizontally, when relaxation begins, and terminates at the bottom of the incline at *E*, where they are let go, and elevated previous to the next muscular effort. This method of action may be repeated rapidly, so that there might be continual flapping of the wings indicating short rises and short slopes in progression. Or, again, if the inclines are lengthened out unduly over the rises, an appearance of a bird sailing through the air is produced, when there is a flap only rarely given by the wings. If the wings of a bird seem to be elevated we may suppose that it is at the bottom of the incline, or with wings depressed we may suppose it to be at the top of the rise. The horizontal flight of birds with wings observed to be flapping would probably, therefore, consist of a series of undulations, or rises and falls, like the tracings of a sphygmograph, representing circulation or respiration. The up and down flappings of the wings would correspond with the down and up curves of the line of flight, and these again with descent and ascent of the body of the bird, to which it would really tally, and not with the motion of the wings (Fig. 2).—*Avis, in Land and Water.*

118. Speed of Birds' Flight.—The highest speed of flight per hour of birds in full plumage is estimated as follows: Crow, 25 to 40 miles; mallard, black duck and shoveler, 40 to 50; pintail, 50 to 60; wood duck, 55 to 60; widgeon and gadwall, 60 to 70; redhead, 80 to 90; blue-winged and red-winged teal, 80 to 100; bluebill, 80 to 110; canvasback, 80 to 120; sparrow, 40 to 92; hawk, 40 to 150; wild geese, 80 to 90. The distance traveled by birds in $\frac{1}{3}$ second is as follows: At rate of 5 miles per hour, .92 feet; rate of 10 miles per hour, 1.83 feet; rate of 12 miles, 2.2 feet; 20 miles, 3.66 feet; 30 miles, 5.5 feet; 40 miles, 7.33 feet; 60 miles, 11 feet; 80 miles, 14.66 feet; 90 miles, 16.05 feet; 100 miles, 18.33 feet; 120 miles, 22 feet; 150 miles, 27.5 feet.

119. Shooting on the Wing.—Shooting on the wing is a mechanical art, like billiard playing, boxing or

fencing. There will, of course, be degrees of excellence; but any one with the full use of his faculties and the ambition necessary to success in anything, can acquire it. The secret lies "in the hand becoming subservient to the eye." The two must be connected by electricity. The eye is never at fault; if it were there would be little hope of improvement; but any one may improve the quickness of the muscles. Like the expertness of conjurers in the art of manipulation, the same practice applied to the gun will make the brilliant shot. Every one can see quick enough. Let out a bird from a trap before 500 persons, and they will all see it at the same instant, but only the practiced shot can throw up a gun to his shoulder with accurate aim and a simultaneously pulled trigger before it has flown 10 feet. A sportsman should shoot game the same as an Indian shoots his arrow, by looking at the object with both eyes open. It may be done by closing one eye, but there is nothing gained by it. There are two ways of shooting on the wing. One, to throw up the gun to the shoulder and pull the trigger at the same moment, termed "snap shooting." The other, equally good, and better to begin with, and more certain upon the whole, particularly in open shooting, is to follow the bird, and, when covered, fire while the gun is in motion. But when you pull the trigger the other hand has a tendency to stop; that misses the bird. But education will teach it not to stop, the same as we teach both hands a different action while playing on the piano.

120. Missing Wing Shots.—When you miss a flying bird try to find the reason for the miss, and next time avoid the error.

121. Confidence in Wing Shooting.—You must have confidence in yourself. Make up your mind that you will get the first bird that starts; and when one does start, if you can see him, let him have it, if there is even a ghost of a chance of killing him.

122. Holding Ahead.—It is evident to all that if a bird is flying from the point *A* to the point *B*, a certain length of time must elapse before the bird reaches *B*. Also, that a certain length of time must elapse before a charge of shot from the point *C* can reach *B*; and in order that the bird and the shot shall reach *B* at the same instant, the gun must be held far enough ahead, so that the time required for the bird and the shot each to reach *B* at the same instant must be the same.



123. Coolness in Wing Shooting.—Coolness is an important quality of the mind in wing shooting. It is a matter of temperament, but can be sometimes acquired. A French writer says: "After the bird rises take a pinch of snuff before you shoot." By counting three before you pull trigger you will thus give the bird time to get into its regular flight, your eye gets a clear view of distance and velocity, and your nerves, which were startled by the sudden whirr, become settled.

124. Quickness in Wing Shooting.—To acquire quickness in wing shooting practice using the gun fifteen minutes daily in the house. Practice throwing it up to your shoulder, hammer down, both eyes open, and pointing at any small object in the room. Then look with one eye along the barrel to verify your correctness of aim; then follow two imaginary birds, first to the left, then to the right, pull the trigger at some object in passing, and see that the motion of following is not checked. When you think that you are tolerably perfect in this action try snapping a cap, quickly, at a lighted candle at 10 feet distance, also at one suspended by a string, to which you can give a pendulous motion, and when you can blow the candle out five times out of six, there is little more to be learned.

125. Flock Shooting.—In shooting at a number of birds flying together, always select one bird for the aim, as near the head of the flight as possible, unless shooting in company, when each hunter aims at the position of the flock nearest his station.

126. Birds Rising to Flight.—Birds rise to flight against the wind. Shoot when the bird is just on the turn or is steadyng itself in the air after rising.

127. Bird About to Alight.—A bird about to alight on the ground is falling, and at such time your aim should be under.

128. Bird Coming Head On.—Don't shoot at a bird flying toward you, but let it pass first. In the first case you shoot against the thick breast feathers; in the second case under the feathers.

129. Rising Shots.—In shooting grouse in cover, always bring the muzzle of your gun up on your bird from below if rising shots—and they almost all are. Don't try to shoot on the "drop," as it is termed, for then the gun is falling and the bird is rising, and you have twenty chances to miss where you have one to kill.

130. Straightaway Shots.—When a grouse starts, nine times out of ten he will start from the ground. If he is going straightaway from you, throw up your gun so as to shoot a little over where you see him, and by the time your gun gets up and discharged, he will have flown right into the shower of shot.

131. Right or Left Shots.—If a bird starts toward the right or left, throw up your gun so as to shoot a little high and in advance of him, say from 1 to 3 feet; you must use your judgment about that, and be governed by the speed of the bird and the surroundings, etc. Follow the bird with your eyes, and your hands will unconsciously follow your eyes with the gun. A "right-handed"

hunter has to make more allowance for speed when a bird is flying to the right, generally, and *vice versa*.

132. Shooting One Barrel.—In a double gun shoot each barrel alternately, or after shooting the right barrel put the left barrel shell into the right barrel for the next shot, and the fresh shell into the left barrel. Neglect of this rule causes loosened shot in the shell or barrel which is not used.

133. Shooting Over a Pointing Dog.—After your dog has pointed, if you are disposed to be nervous, remain perfectly quiet for a full minute. This will serve to steady you, and will teach the dog habits of stanchness. In the meantime, cast your eyes around, to see in what direction the birds are likely to fly when flushed. If there is a cover of any sort, woods or swamps, within a radius of three hundred yards, you may be sure the birds will make for it; and, in the absence of woods and swamps within reach, if there be a depression or hollow, or fence overgrown with grasses or briars and weeds, the chances are that the birds will go there. After you have taken this observation, settle, as well as you can, from the direction in which the birds are likely to fly. This plan possesses two advantages; the birds, in passing, should they persist in going to the covers, will give the sportsman the fairest possible shot, with the chances of his striking a vital part considerably increased over a dead-away one; and in using the second barrel, the smoke from the first does not interfere. A covey has been kept by these tactics from dense cover, into which it would have been folly to have followed them. Walk your birds up slowly and deliberately; do not rush on them, as though you were frightening an obstreperous pig; and do not shoot the moment they get out of cover; you will miss entirely, or tear your bird up so that it will be useless. Wait till the bird has passed you if they persist to cover, or, in other words, in passing cross shots;

or, if they be going straightaway, until fully twenty paces off.

134. Marking Down Birds.—If the sportsman is not provided with a marker, he ought to try to mark his birds down as well as he can; this is not so easily done when he uses both barrels at the rise; he can, however, locate the bird very nearly, or, if his dog be an adept at the business, he will assist very materially. Practice in marking can alone make perfect. The best plan is to keep the eye well ahead of the birds; when they are ready to alight they will perform the arc of a circle, fold their wings, and come to grass.

135. Approaching Marked Down Birds.—When approaching the ground where the birds likely dropped, send the dog forward, steadying him by frequent commands, and making him work always directly in front, swinging backward and forward after the manner of a pendulum. If the sportsman finds the birds run after alighting, and the dog is disposed to road them up by ground scent, check him sharply, bringing him to heel; make a detour, so as to get beyond the birds, then work toward them from the direction in which they are running, otherwise the strong scent, arising from ground and coming down wind, confuses him, and he is apt to make a long point, if cautious, or to flush his birds outright, if disposed to press his points. If, however, the birds have not moved, keep the dog well in hand, hunting thoroughly every part of the ground, over and over again if necessary. Frequently they lie so close they will suffer themselves to be trodden on before taking wing. When at last the dog makes point, approach him cautiously; the probabilities are very strong that you will spring one or more birds in going to him, and, remember one thing—never budge an inch without being ready for instant work. After he has walked up the pointed bird, the sportsman's ears may any moment be assailed

with the sharp whirr of hurrying wings. Do not leave the ground until you have sprung something like the number of birds you may think dropped there.

136. Rifle Hints for Shotgun Hunters.—The first thing to be done when a deer starts is to remember that you have a rifle in your hands and not a shotgun. The number that can be missed, even inside of 25 yards, with a rifle fired as a shotgun, by good shots on quail or woodcock, is perfectly amazing. A deer in market or in a picture looks quite large, but in reality they are a very small mark. There is around them an immense amount of vacancy, and the tendency of a bullet to find it is marvellous.—*Van Dyke*.

137. Sights for the Hunting Rifle.—The sights should be moderately coarse, and the front one of ivory, except for hunting on snow, where brass or gold is the best. File off the “buckhorn” sides of the back sight, so that you can get a clear view of your game when holding ahead of it. The “buckhorns” are really of no use but to prevent reflection of light from the corners of the notch, and this you can do as well by rusting them with iodine or acid. I go so far as to cut down the sides until the notch stands in a little cupola in the middle, affording a perfect view all around it. I find such a one worth a cartload of buckhorn sights, though it takes a little practice to get used to it, when it is caught just as quickly by the eye as any other.—*Van Dyke*.

138. Throwing Rifle Ahead of Game.—It is not necessary to throw your rifle ahead of the game when you first raise it. But it is always expedient to do so. If you raise it directly on the mark the temptation to pull is often too strong to resist.

139. Practice for Running Rifle Shots.—Good practice with a rifle may be had with a small wheel rolled where you can see the balls strike; and if you can

make the wheel bounce by obstructions on a hillside it will be much better.—*Van Dyke*.

140. The Trigger for Running Rifle Shots.—For running shots a set trigger is an abomination; equally so is the 3-pound pull. It should be so that a moderate jerk will fire it without disturbing your sight, and without the necessity of beginning a moderate pressure as you would with a hard trigger at a target. About $\frac{1}{2}$ to $1\frac{1}{2}$ pounds is about right, though for a heavy rifle 2 pounds would perhaps be easy enough.

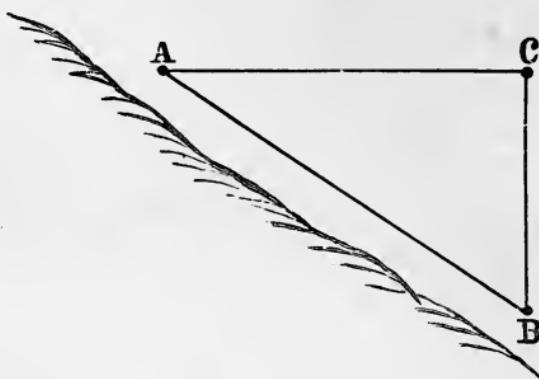
141. Coolness in Rifle Shooting.—Remember that coolness is absolutely indispensable and that haste will do you no good. Let quickness come with time, and practice slowly and carefully. Do not be beguiled into fast shooting at that Creedmoor target; make it your first point to hit, and don't shoot at first more than once on one run, unless you have a double-barreled rifle. Let others try to see how big a hail storm of bullets they can get up in a given time if they like it, and don't be at all bothered if by so doing they happen to make more points than you. You will in the end do by far the best work on game if you take it easy and make accuracy the first point.—*Van Dyke*.

142. Magazine Rifles on Game.—Fire every shot from a magazine rifle with as much care as if it were your last ball. Fast "pumping" never succeeds so well as careful aiming, and it tends to carelessness.

143. Shooting Beyond the Point Blank.—There will be generally little use in shooting beyond the point blank of your rifle; unless in cases where there is no probability of your deer stopping for a standing shot.

144. Rifle on Game Down Hill.—The tendency in aiming down hill is to overshoot, except on a very long shot (600 to 1,000 feet) down a very steep hill, when the tendency is to undershoot.

145. Hillside Shooting with Rifle.—Let *A* be the position of the hunter, *B* the position of the animal aimed at on mountain side. The solution is: In aiming be governed by the horizontal distance *A C*, or distance



to a point perpendicularly over the animal. Reversing the positions, with the hunter at *B* and animal at *A*, in aiming be still governed by the horizontal distance *A C*. In other words, take no account of the height (*C B*) you may be above the animal, or the air line distance *A B*, but be governed entirely by the horizontal distance, *A C*, which is much more easily estimated than the distance *A B*, generally thought to control the aim. In afterward bringing these principles into practice I never failed to hit my game. The last time they were used upon two bull elk, at least 200 yards down a mountain side, which was estimated to be much further. From an overestimate of distance the two first shots missed. Taking new reckoning of distance, and making use of above principles, the elk standing apparently dazed from the unexpected reports, the next eight consecutive shots were put through the two elk before getting out of reach.—*W. D. P.*

146. Estimating Distance in Hunting with the Rifle.—Overestimating distance of game is a mis-

take that is amazingly common. It will almost always occur with beginners, except when game are across water, across smooth, clean snow, or from one high hill to another where the intervening valley has a broad bottom. In these three cases underestimating distance is the rule.

147. Overshooting Game with Rifle.—The tendency to overshoot game with a rifle is one of the remarkable and inexplicable things about hunting, and this tendency is especially strong on running game. For this reason file the back sight flat on top. If the sides are higher than the center notch, there will be a constant tendency to shoot too high from trying to see your game above them. With a little practice you can catch this sight quite as quick and shoot just as well as with the back sight, which for good work is only a useless nuisance. I go still further, and cut down the sides about one-twentieth of an inch, leaving about one-sixteenth of an inch on each side of the center notch (which is simply a fine split) standing above the rest of the sight. Over the sides of this I can get a clear view of the whole body, even to the feet of a deer in any way he may run. I find that I can catch this sight just as quick as any other, after a little practice, and am not half so apt to overshoot.—*Van Dyke.*

148. Rifle Shooting at Night.—To shoot at night chalk the top of the barrel, from breech to muzzle.

149. Rifle Shooting in Cover.—In hunting in the woods you must watch three things: 1st your sight, 2d the deer, 3d the trees. Where trees are very thick it is often best to pick out an open place and throw your sights into that, firing just as the deer gets within the right distance from them. But be sure and not wait until he touches the line of your sights or you will miss him if he is going at any rate of speed or is at any distance.

150. The Rifle on Deer.—Use a rifle having the flattest possible trajectory up to 150 yards, and never raise the sights (taking coarse front sights or holding high on game) unless very certain of its necessity, and when in any doubt always decide on the level sight. If not very familiar with the trajectory of long-range rifles, you will be apt to miss deer from 100 to 140 or 150 yards by holding a level sight on them and having the ball drop under. And after you do know their trajectory, you will be extremely liable to undershoot in trying to avoid the danger of overestimating distance, and to overshoot the next one, perhaps, in trying to avoid the previous error. Paradoxical as it may seem, the longer the range of a rifle the worse it is for hitting game from 90 up to 200 yards. Don't shoot at the middle of a deer. A deer hit anywhere from three inches back of the shoulder to the hip, unless the backbone or kidneys be touched, can run for miles unless shot with an extra large ball, and often even then unless the ball is expansive. In such case let it alone until it lies down and sickens, and don't go after it even then, if you can possibly get around or above it for another shot. In, or just behind the shoulder, about one-third the way up, is the best place to shoot, if you can get a chance; but you will have to take shots just where you can get them, especially on the run.

151. Shooting Bounding Deer.—Generally a running deer is a bounding deer and often a bouncing deer. The black-tailed deer, especially, often runs as if bouncing on India rubber, rising, apparently without effort, from 1 to 2 feet at every jump. When running over ground that is rough, rocky, covered with logs or low brush, a deer is nearly always jumping with high and often irregular springs. Now (unless very close), just as surely as you shoot at where he is, just so surely will the ball strike where he is not. The best way is to catch him as he strikes the ground, and for this purpose, where you

have time, you must keep the rifle ahead of him for several bounds, until you catch the length and height of his jump. Then, when he is at the highest point, shoot at the spot where he will be when he strikes the ground, and, above all, be sure and pull when he is in the air. To get the right distance ahead, and at the same time the right elevation, and pull just at the right time, is a very nice operation, and a miss is never discreditable; but, with care and coolness, you will in this way make shots over which you will chuckle for a month. If a deer be running low you may disregard this up and down motion, and if running very fast you must disregard it; but when bounding high you cannot overlook it with safety, and in straightaway shots you must hold about for his knees when he is up.—*Van Dyke*.

152. The Rifle on Deer and Hares.—A deer seldom runs at full race-horse speed. His usual gait is a graceful canter or springing jumps. Still he is going faster, and your bullet is much slower than you suppose. A hare (California jack rabbit) under full speed, at 50 yards, wants about 5 feet margin, running at a light gait, about $2\frac{1}{2}$ or 2. Running quartering at 40 or 50 yards I have repeatedly struck just behind them, although holding a foot ahead. And even when running at a very sharp angle to the line of fire, I have invariably made the dust fly behind them when holding directly on, and this too, at not over twenty paces distance. Holding ahead must never be neglected unless your deer is very close or going very slow, and even then it will be safe to hold off the body, even though it may also be safe enough to hold on. At a deer driven toward me, and coming on a course so slightly quartering that he would have passed within 20 yards of me (or, as our Creedmoor riflemen would aptly express it, coming like an 11 o'clock wind), I fired at about 75 yards. I held just so as to see a strip of daylight ahead of his breast, and struck in the middle. These

distances are taken from shooting done with a .44-rifle, 70 grains of powder, and the long-range (530 grains) ball. With 77 grains of powder I could see no difference in practicing on hares, although with a round ball the difference is perceptibly less at 100, and even up to 120 or 130 yards, though not enough to be of much consequence for deer. In shooting from a running horse it will, of course, not be necessary to hold ahead where the speed is equal.—*Van Dyke*.

153. Hounding Deer.—Deer have certain runs, generally upon the dividing ridges and through the swags of ridges. Standers are placed on these runs and the driver takes his dogs, from two to a dozen or more, and generally drives against the wind, which is the way deer, especially old bucks, always run. The deer hunter that understands his business, in taking a stand to wait for the driver to drive out the deer, always takes his position against a tree, fronting the way he expects the deer to come. In standing for deer you should never get behind anything, for the deer is almost certain to see you move, and then he will change his direction.

154. Still-Hunting Deer.—The best time for still-hunting is in running time, in the months of October and November, after the does are with fawn and are running and hiding from the bucks. When you see a doe running through the woods, go and take your position in shooting distance of where she passed, and keep a sharp lookout the way she came, and often, in a very few minutes, you will see a buck coming, tracking her. Let him come up near enough for you to get a fair shot, bleat or whistle at him and he will stop. If you are a marksman, then you will have venison. Still-hunting in the months of October and November is the most successful way of hunting. Sportsmen that are good rifle shots are the most successful still-hunting. Shotguns will do for driving, but rifles are the best to use in still-hunting.

155. Slow-Tracking Deer.—Slow-tracking deer with a dog is a very successful way of hunting. The dog, from a small puppy, must be trained. A half-hound is generally preferred. A cross of a hound and cur or bulldog is best, as the hound gives the acute scent, and the bulldog or cur the speed and bravery to take hold when he comes in contact with a crippled deer. The dog is trained to follow the track by scent in a slow walk, and you follow the dog ten or twenty feet behind, and keep a sharp lookout for the deer. When the dog has a strong scent of the deer you can discern it by the precaution he uses, and when he sees them he stops and waits for you to shoot, and at the fire of the gun he does not break and run, but waits to see what you want done. If you have crippled the deer urge him on, and if it be badly crippled he will catch it and kill it, and you wait on the track where he started from when you urged him, and he will return and take you to the dead deer. This is the most successful way of hunting, and by it you can find out more about the habits of the deer than from any other mode of hunting.

156. Dead Deer.—A deer's throat should be cut and entrails drawn at once after it is killed.

157. Dead Deer in Water.—A deer in the red coat sinks, while that in the blue coat floats, without regard to the fatness or leanness of the animal.

158. Deer and Moonlight.—Where deer are comparatively undisturbed they feed nearly as much in the day as in the night, when the moon is up. If the moon has shone all night they will lie quiet all the next day. When the moon has been up all day they will lie quiet all night. During the last quarter of the moon, when the moon has been down nearly all day, they become very hungry and feed nearly all night, so that is the best time to fire-hunt. If you wish to still-hunt, go when the moon

rises or is yet up, whether forenoon or afternoon. If you hunt with dogs go at other times, as they will be sluggish and won't run far ahead of the hounds. The best time to fire-hunt is a dark, cloudy night when the moon is up.

159. Hanging up a Deer.—After inserting a gambrel in the hindlegs of the animal in the usual manner, cut a couple of crotches about eight feet long, then bend down a springy sapling and insert the top under the gambrel. Now place your crotches, butt outward, at right angles to the sapling, hook one of them into the sapling, just below the gambrel, and place its butt so it will not slide; now, with the top of the other crotch in your hand, lift up on the sapling, pressing it against the crotch at the same time. When as high as you can get it, insert the other crotch above the gambrel. If the sapling is not strong enough to hold the weight of the deer, carry the foot of this crotch toward the other and the thing is done. If the deer is very large, or your muscular energy small, you can start with crotches three or four feet long and then use longer ones.

160. Pinnated Grouse.—Pinnated grouse (prairie chicken) will be found in the stubble fields in the morning and evening, and near sloughs or in cornfields in the middle of the day.

161. Ruffed Grouse Habits.—When alarmed, the ruffed grouse sometimes squats close to the ground, but generally takes wing and alights on some tree where it remains closely concealed under the branches near the trunk until the sportsman has passed. Their favorite resorts are sides of hills overgrown with hemlock and cedar, with undergrowth of laurel. In level countries they frequent swampy covers and scrub-oak patches, and lie better where there is a tangled and briery bottom. When flushed on a hillside they generally fly uphill and can be found directly over the summit.

162. Treeing Grouse.—When flushed on level ground a ruffed grouse (partridge), if flying low, will alight on the ground. If he gradually rises and suddenly darts upward, look for him on the nearest evergreen to where you saw him last. If he at once rises to the top of a tree and then shoots off like an arrow, he will fly away to a distance. If he flies up a steep hillside he will alight on the ground, but if from a hill to a level below, he will be in some tall hemlock or spruce, standing straight and immovable on a limb near the body of the tree. If he flies from one hill across a ravine to another hill he will alight on the ground. The shorter flight the bird takes before alighting the more ready he is again to take to flight. If he trees immediately after being flushed he will take the most prominent limb in view, and, unless your dog holds his attention, will be away when he perceives you; but should he fly some distance and be followed by your spaniel at full cry, he will alight on the limb of a hemlock or spruce near the body of the tree, hug his feathers close and stand as motionless as a knot. A side shot is surer than one in front or back. Get a tree between you and him if possible, or walk toward him as if you didn't know he was anywhere about. Shoot the instant you stop walking or you lose your bird.

163. Quail Hunting.—Don't start out too early in the morning; the birds are then seeking their feeding grounds—are running, and will never stand well to be pointed. Wait until the sun has dried off most of the dew, and you can hunt with decidedly more comfort to yourself, as well as to your dog. The birds will have finished feeding in a great measure in the meantime, and will be quietly resting in some grassy covert in their feeding grounds, or immediately contiguous thereto. Their flight will not be so long, and their movements more sluggish after taking flight, which however they will do very reluctantly.

164. Snipe Shooting.—Snipe lie best to the dog on warm, sunny days, when gentle winds are blowing. Hunt them with the wind at your back, as they rise against the wind in a zigzag course. Sometimes in the spring they frequent swampy thickets or low willow bottoms.

165. Loon Shooting.—To shoot loons aim ahead of them at the water, as they always plunge forward.

166. Woodchucks.—To drive woodchucks and other animals out of their holes take a small water turtle, bore a hole in his shell just above his tail, fasten a piece of wire 6 inches long to the shell, and at the end of this tie a piece of cotton, well saturated with kerosene. Place the turtle head-on into the hole, light the cotton, and he will go through and drive out the game.

167. Duck Call.—A duck call or squawker is made thus: Take a tube of wood or metal (bamboo is best) about $\frac{1}{4}$ inch in diameter inside, and 4 to 8 inches in length. Fit a plug 3 inches long to one end, split it in two, groove one half to within $\frac{1}{4}$ inch of its smaller end, the groove being $\frac{1}{4}$ inch wide and same depth. Hammer a thin piece of steel, copper or brass $2\frac{1}{2}$ inches long and $\frac{1}{8}$ to $\frac{1}{4}$ inch wide, to increase its elasticity. This is the tongue, and one end, which should be thinner than the other, should have the corners rounded. The tongue is then placed over the grooved half, the round end nearly to the extreme smaller end of the plug, and the tongue completely covering the groove. The other half of the plug should be shortened about $1\frac{1}{2}$ inches from its smaller end, and then being placed on the grooved half, thus holding the tongue fast, both should be pushed firmly into the tube. By blowing into the other end of the tube the call is produced; the tone, degree of firmness, etc., being regulated by moving the shortened end of the plug in or out as a finer and sharper, or lower and coarser note is re-

quired. Practice and experience are necessary to make it effective.

168. Snipe Whistle.—A whistle to call snipe is made thus: Carefully dry the leg of a curlew, push out the marrow with a red-hot knitting-needle, plug up one end, and then practice.

169. Turkey Call.—Take a piece of dog wood or maple, say 6 inches long by $1\frac{1}{2}$ inches diameter, and with a small-sized bit bore a hole through it lengthwise, then with a tapering or hollow bit ream it out to the size of $1\frac{1}{4}$ inches tapered to size of small bit. At the other end insert a piece made either of wood, horn or cane, according to fancy, for a mouthpiece. The tone of the caller depends largely on the size of the mouthpiece, and great care should be bestowed on this part of the caller. When the turkey note is perfected to suit the individual, the shape and finish can be arranged. A caller adapted to one hunter cannot be used by another, unless he is an adept in the business. Some hunters yelp by placing the caller in the center of their mouth, while others yelp from the side. There are some notes which cannot be made from the side of the mouth. In hunting, different notes will have to be made according to the game in which you are in pursuit of. For instance, if a flock of turkeys were flushed, and it were necessary to kill the old hen, you would yelp like a young turkey; if a young one was desired, you would imitate the hen. And in pursuit of the gobbler, you would not yelp like either of them, but you would bring to your aid patience, "turkey sense," and all the cunning possible to capture him.—*Lowndes*.

170. Turkey Calls.—Make a little box of Spanish cedar $2\frac{1}{2}$ inches long, $\frac{4}{5}$ to $\frac{7}{8}$ deep and 1 inch wide. Cut a piece of smooth slate that will lie nicely in the bottom of the box; have the top smooth and even. Make the box without glue, put it together with brass pins. To operate this, hold the slate between the thumb and middle finger

of the right hand while the call is held by the thumb and middle finger of the left. The common bone call is made from the hollow wing bone of the bird. The ends are cut off, and the call note is made by violently sucking through the tube. With a narrow chisel hollow out a piece of dry cedar, 2 inches long, and $1\frac{1}{2}$ inches wide and $\frac{1}{4}$ inch thick, so that the sides are about as thick as a piece of tin; but do not let them be too delicate. It should be hollowed out within $\frac{1}{4}$ inch of the bottom and ends. Taking this simple caller between your thumb and fingers, rub it crosswise against the butt of your gun or on the barrels. No rosin is required; the simple wood can be manipulated with a little practice to perfectly imitate the turkey call.

171. Duck Shooting.—Ducks fly low, near the water, on a windy day. For the first flight of the fall (young ducks) use $3\frac{1}{2}$ drams powder, 1 ounce No. 6 or 7 shot; but when the older birds arrive, 4 drams powder and $1\frac{1}{2}$ ounces Nos. 4 to 6 shot is a good load.

172. Flight of Ducks.—A wild duck flies, say, 90 miles an hour, or one mile in 40 seconds, or 132 feet a second. Velocity of shot for short distance is, say, 1,350 feet a second. If a duck be 50 yards away, it will require one-ninth of a second to reach it if still. But the flying duck, at the instant the central shot crosses his line of flight, is nearly 15 feet from the point where he was when the shot left the gun. Hence the aim in this case should be 15 feet ahead.

173. Flight of Ducks.—Unassisted by the wind ducks fly from 80 to 100 miles an hour. When they fly against the wind, they travel low and close together. Never shoot at ducks coming "dead on," but wait until they have passed or are on a line with you. Their thick breast feathers will prevent shot entering their bodies when coming "dead on."

174. Ducks' Power of Scent.—It is always best to approach ducks and all wildfowl on the water against the wind, as their sense of smell is singularly well developed.

175. Edible Species of Duck.—The mallard, teal, canvasback, redhead, widgeon, black duck, pintail, blue-bill or broadbill, redneck, whistler, butterball or buffle-head. Some of these ducks, like the butterball, are edible in some waters and unfit to eat in others; the difference is owing to the kind of food they obtain.

176. Blinds for Duck Shooting.—Blinds or bough houses should be built on the ducking grounds before the season commences, as ducks will avoid any new structure after they arrive. They may be made of logs, brush, grass, cornstalks, etc., and should completely conceal the hunter.

177. Decoys.—In both duck and bay bird shooting the decoys are always to be set to the windward of the blind. Set out about fifty, if possible, as the greater the number the better the show to attract the flocks. The stools should be set in a crescent-shaped circle, with the heads of the decoys pointing to the wind. There are two reasons for arranging them in this way: First, all wild fowl alight to the wind, as they need the resistance to the air; second, flocks of birds that intend to stool drop down to leeward, where they circle and then draw in over the decoys. It is, therefore, not advisable, as a rule, to shoot at a flock passing over your head, as it will turn, and should it light it will do so at the head of the line of stools. It will thus be seen that as the birds check their flight to alight, they crowd and jostle together, affording the most killing results of a well directed volley into their ranks.

178. Paint for Decoys.—Decoys painted with lampblack and oil will have a more natural look than those painted with bright polish paints.

179. Live Decoy Ducks.—Mallard, black and most fresh-water ducks will stool to live decoys, which should be wounded ducks of a similar class caught alive. Fasten to one leg of each live decoy a close-fitting leather boot, just above the foot, and attach a weight to the boot by a stout cord as an anchor. Set out the same as wooden stools, or use with wooden stools, taking care to anchor them far enough apart so that their anchor lines will not become entangled. Feed them on corn, and carry them in a crate or basket until they are accustomed to their work.

180. Diving Decoys.—Run a long cord from neck of decoy through a block on the anchor weight and thence to blind or bough-house. By pulling this cord at intervals when the decoy is anchored out it will make the diving motion noticed in ducks when feeding.

181. "Toling" Ducks.—Ducks are frequently led up to a blind in the marsh by the hunter waving a red blanket, scarf or other cloth in an erratic manner. Sometimes a red spaniel will, by running back and forth on shore, attract the curiosity of a flock of ducks resting on the water and lure them to death. The fox is said to practice this art to obtain a dinner of wild poultry. "Toling," as this is called, won't work where ducks are much hunted and wild. Black ducks, gray ducks, red-heads, bluebills and sheldrakes are said to be the only ducks that will "tole."

182. Sinkboat.—To sink a boat for duck shooting take old salt sacks, put in enough sand to sink boat to required depth; when through shooting empty the bags of sand.

183. Blinds for Bay Bird Shooting.—A box sunk in the sand is the most killing device. The box should be long enough to allow the gunner to lie in it comfortably, and its width should be several inches in

excess of the breadth of his shoulders. From 10 to 15 inches will be of sufficient depth. It should be made of $\frac{3}{4}$ -inch stuff, calked and pitched on the outside and in, thus making it thoroughly water-tight. At one end, near the top, an iron staple should be clinched, to which a $\frac{1}{2}$ -inch rope of about 7 feet in length should be fastened. This will be found useful in towing the box behind a skiff, or for dragging it over the sand. Other blinds are easily constructed out of cedar boughs, cut about four feet in length, stuck in the sand or mud. They can also be made, when the wind is not blowing too hard, out of long reeds cut on the marsh. Painted canvas screens, hinged so as to fold up, have been used, and one of Long Island's famous gunners once used an umbrella painted green. The fact is, it depends very much upon the place, and, moreover, on the conditions of wind and weather where to stool. While a vast number of birds in their autumnal flight follow the irregularities of the coast, there are countless numbers who make their migration far to sea, or take short cuts over the mainland. Those passing to sea only touch at the projecting points, and are consequently tame, while those who have run the gauntlet of an even shore or beach are wild, and less likely to stool. All these things must be taken into account, and the wilder the birds the better you must be hid. Sometimes it is impossible or inconvenient to construct a box such as described, or find suitable stuff to build a blind; then a rubber blanket can be spread on the marsh, and a few sedge bushes or heaps of seaweed placed around you.

184. Bay Bird Stools.—There are various kinds of stools manufactured, such as both solid and sectional wooden ones, hollowed out; flat tin stools, cut out of sheet-tin, and several years ago a patented tin stool was introduced on the market, that met with favor in the eyes of those sportsmen who cared little for expense. The latter are of very ingenious make, each half of the

decoy being concave on the inside and convex on the out, thus representing one-half of a bird; the two parts are hinged together on the back, so that when shut they resemble a well-formed snipe, and when open can be packed one in another, after the manner of a nest of boxes, and occupy but little space. All these decoys are painted to resemble the different varieties of snipe, and are stuck up by means of sticks. Each set of stools should have sticks, or "legs," of two lengths—short ones when used on dry bars or very shoal water, and long ones when the water is deep. It should be borne in mind that stools set in water are more readily seen, as the reflection and a watery background make them loom up and show to advantage. For wet stooling the wooden ones are preferable, as the tin ones soon rust and become worthless. The objection, however, to the wooden stools is their weight and bulk. For plover shooting on the up-land or dry ground, the tin ones are by far the best. It may here be said that shells, lumps of mud, etc., placed on sticks, often can be used when it is impossible to obtain the regular decoys.

185. Stooling Bay Birds.—Should you find that large birds, such as curlew, marlin and willet, have a roosting place on one of the bald marshes, the box blind should be used, or if thoroughfares dissect the marsh, you can paddle your skiff, which should be painted green, up one of the drains toward the spot where the birds lower their flight, or circle over before alighting, and conceal it in the highest tuft of grass. Curlew, and especially the "jack," do not stool well where a blind has been erected. They are wary at best and wild when their favorite haunts have an unnatural look. Willet almost invariably stool well, and both the marlins are unsuspecting. The large and small yellowlegs, dowitchers, robin snipe and lesser birds are readily called within reach, providing, of course, that the proper place has

been selected. The bars and shoals are the favorite haunts of the blackbreast plover, the willet and dowitchers, while the meadow pond-holes are the sure places to attract the yellowlegs, especially when the birds are traveling with the wind, or as baymen call it, a "free wind."

186. Weather in Bay Bird Shooting.—The most favorable wind for bay snipe shooting in the summer and autumn is one that blows steadily from the southwest. The birds that are coming from the north, and flying against it, lower their flight and skirt the bars and meadows, and see the stools more plainly and decoys much better than when traveling with the wind in the clouds. A wet summer is also found to produce the best shooting, as the meadows afford plenty of feed, and should the birds arrive early in the season, they stop and make the large marshes their home, flying north in the morning and returning south toward evening. This flight baymen call "a trade."

187. Killing a Wounded Bird.—Many gunners bite its neck with the teeth. This will not break the skin. Others squeeze the bird on both sides close under the wings and at the same time press the forefinger over the wishbone. This stops heart and lung action and causes almost instant death, but it is impracticable to kill large birds in this way.

188. Preserving Dead Birds.—Draw and stuff with green grass; cover bottom of box with a layer of coffee grounds, then pack a layer of birds; then another layer of grounds, then birds, and so on until all are packed. The grounds should be perfectly dry.

189. Preserving Killed Game.—Take a supply of paper sacks (such as grocers use), just large enough to put a chicken into and tie snugly. Draw the birds and hang by the head until they have thoroughly dripped

and the natural heat has left them. Stuff fresh leaves or grass inside; put into the sacks head first, and tie sack tight enough to exclude the air. Put them in a cool, shady place until ready to ship. Birds packed in this way have kept over fifty hours, and when used were sweet and fresh, and this during the hottest weather of August. Never put game on ice unless you can keep it there until ready to use, for it spoils in an almost incredible short time after being taken off.

190. Weight of Quail and Woodcock.—The average weight of quail is about $6\frac{1}{2}$ ounces; of woodcock a trifle less. Quail run from 4 to $7\frac{1}{2}$ ounces; woodcock seldom weigh less than 5, and sometimes $8\frac{1}{2}$ ounces, but their mean weight is a little less than that of quail.

191. Game by Express.—When game is sent by express the number of heads should be noted in the receipt. A "bunch" of quail may fall short.

192. Fowlers' Terms.—Fowlers speak of a *sege* of herons or bitterns; a *herd* of swans, cranes or curlews; a *depping* of sheldrakes; a *spring* of teals; a *covert* of coots; a *gaggle* of geese; a *badelynge* of ducks; a *sord* or *sute* of mallards; a *muster* of peacocks; a *bevy* of quails; a *congregation* of plovers; a *walk* of snipes; a *fall* of woodcocks; a *brood* of hens; a *building* of rooks; a *rummuration* of starlings; an *exaltation* of larks; a *flight* of swallows; a *host* of sparrows; a *watch* of nightingales; a *charm* of goldfinches.

193. Trapping Season.—All furs are best in winter; but trapping may be carried on to advantage from Oct. 1 to April 15. In the hot months furs are worthless.

194. Deadfalls.—A deadfall consists of two large poles (or logs when set for bears or other large animals) placed one over the other and kept in place by four stakes, two on each side. The upper pole is raised at one end high enough above the lower to admit the

entrance of the animal, and is kept up in that position by the familiar contrivance of the stick and spindle, or "figure four." A tight pen is made with sticks, brush, etc., on one side of this structure, at right angles to it, and the spindle projects obliquely into this pen, so that the bait attached to it is about 8 inches beyond the side of the poles. The animal, to reach the bait, has to place his body between the poles and at right angles to them, and on pulling the spindle, springs the "figure four," and is crushed.—*Newhouse*.

195. Baiting Steel Traps.—Never put a bait upon the pan of a steel trap. Place it so that when the animal smells the bait its foot will be upon the pan. Therefore, either hang the bait from a stick above the trap or set it in an inclosure so arranged that the animal will have to step over the trap to reach it.

196. Clean Your Traps.—Traps should be smoked or cleaned occasionally after game has been taken in them.

197. Trap for Mink.—A mink trap is made by boring a 2-inch or $2\frac{1}{2}$ -inch hole in a log, 4 or 5 inches deep, and into the edges of this hole drive three sharpened nails, so that they will project half an inch or so inside. The bait being at the bottom, the mink pushes his head in to get it, but on attempting to withdraw, it is caught by the nails. Muskrat is good bait for them, and a highly praised bait is made by cutting an eel into small bits, which are placed in a bottle and hung in the sun, and after a time become an oily and very odorous mass. A few drops of this are used. The above simple mink trap may be made by using any block of wood, or a stump of a tree, large or small, and the same plan may be made use of to trap skunks, or, by using a small hole and some straightened fish hooks, it will serve to catch rats or weasels, enemies of the rural poultry yard, which may be thinned out by the use of this trap.

198. Trap for Mink.—For the mink, in regard to scent, I think that prepared from trout superior to any other. In summer, when I have a mess of trout to dress, I take some heads, etc., and put them into a strong glass bottle in the sun and they will turn to an oil that gives a very good scent—one that will attract the mink better than any other I have ever used, and by using a small chub or sucker and a few drops of the scent you have a killing bait. As steel traps are rather heavy to carry and it takes some time to set them properly, I dispense with them as much as possible, especially if the country I am trapping in is heavily timbered. In the place of them I take a 2 or 2½-inch auger with a short shaft, and having at the end of the handle a small hammer with a claw, and also a supply of small wrought nails with large heads and the points well sharpened by a file. Now, in ten minutes I can make, set and bait a trap for minks that has no equal. I find some log near a stream or the root of a tree, bore a hole about 4 inches deep in the side and throw a little mud or sand in the bottom. If the hole is bored in the top of the log, I have to place a piece of bark in a position to keep the rain from filling the hole with water. Then I take three sharp nails and drive them in so they will project inward and downward about $\frac{1}{2}$ inch, just deep enough to make them secure. Then I take a piece of fish, drop a little of the scent on it and place it at the bottom of the hole. The trap is thus complete and ready baited. The mink can shove his head past the points of the nails to get at the bait, but cannot get back. In going my rounds all I need to do is to draw the nails, remove the mink, replace the nails and my trap is reset.—*G. W.*

199. Trap for Foxes.—Take a common field mouse's skin and stuff it. Set your trap near a stack of grain, or at any place where a fox is likely to pass. Cover the trap lightly and sprinkle some of the mouse chaff around it.

Place the stuffed mouse on the pan of the trap so that it can be plainly seen. As the fox is attracted by the scent he will see the mouse and will not hesitate an instant, but will pounce both forefeet on the mouse without the least suspicion of a trap. It requires a strong trap to hold him this way.

200. Trap for Foxes.—Select some warm springy place on a sidehill, or a boggy place that does not freeze up, and at the point where it is the wettest get some small pieces of turf about the size of the hand to serve as "steps," and beginning at one side of the wet place at regular intervals of about 12 inches fix them so that they will be strong and dry until you reach the springy or wet place where you wish to set the trap. Then skip one piece, and continue the line of steps until you get to dry ground on the other side. A narrow place that will require only three or four steps on each side of the trap is sufficient. Then cut a strong thin piece of turf of the same size and appearance as the others to place over the pan of the trap. For scent go to some chicken house and get some very fine dry manure (it must be very fine and dry), and put it in a coarse cloth or bag. Then when the ground is dry drag the bag about a quarter of a mile each way from the springy hole, where you have placed the turf steps. If the bag is coarse and the ground dry, you leave enough scent for every purpose, as the rains will not wash it away, but improve it. Then go to a granary or some place where mice abound, and get some of the mice chaff usually found around such places, which generally smells very strong of mice. Then set the trap in the water, and placing the last piece of turf over the pan the line of steps is complete. Then where you have stood sprinkle a little chaff and pass on, not retracing the steps; and as sure as a fox strikes the trail he will follow it up, and when he comes to the spring (a fox is very careful about stepping in the water) will try the steps, and as the

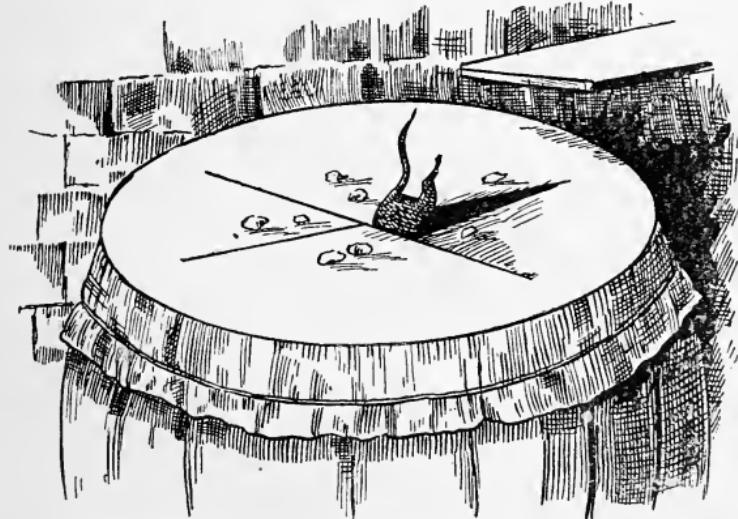
first and second are all right, and hold him, and as they are placed about the right distance apart for his gait, he is pretty sure to step his whole weight on the one concealing the trap.

201. Trap for Otter.—The habitation of the otter is made in the banks of the river which it frequents, or sometimes in a hollow log or crevice beneath rocks. A short search will reveal the place where they crawl from the water on to the bank, and at this spot, which will generally be shallow, a steel trap should be set, on the bed of the river, about four inches under water. The trap should be secured by a stout chain, the latter being ringed to a sliding pole, which will lead the animal when caught into deep water. If deep water is not near at hand, the spring pole may be used, the object of either being to prevent the animal from gnawing off its leg and thus making its escape. The trap may also be placed at the top of the slide, two or three feet back of the slope, a place being hollowed out to receive it and the whole covered with snow. To make success more certain a log may be laid on each side of the trap, thus forming an avenue in which the animal will be sure to run before throwing itself on the slope. Care should be taken to handle nothing with the bare hands, as the otter is very keen scented and shy. Anoint the trap with a few drops of fish oil or otter musk. If none of these are handy, ordinary musk will answer very well. The trap may also be set and weighted with a heavy stone and chain, as described for trapping the beaver. Another method still is to find some log in the stream having one end projecting above water. Sprinkle some musk on this projecting end and set the trap on the log in three or four inches of water, securing it firmly by a chain, also beneath the water.—*Gibson.*

202. Trapping Otter in Winter.—In the winter when the ponds and rivers are frozen over the otters

make holes through the ice at which they come up to devour their prey. Where the water is a foot deep beneath any of these holes the trap may be set in the bottom, the chain being secured to a heavy stone. When the otter endeavors to emerge from the hole he will press his foot on the trap and will thus be caught. If the water is deep beneath the hole the trap may be baited with a small fish attached to the pan, and then carefully lowered with its chain and stone to the bottom. For this purpose the Newhouse, No. 3, is best adapted, as the otter is in this case caught by the head. The beaten track of the animal may often be discovered in the snow in the winter time, and a trap carefully sunk in such a furrow and covered so as to resemble its surroundings, will be likely to secure the first otter that endeavors to pass over it.—*Gibson.*

203. Trap for Rats.—The barrel trap device possesses great advantages in its capabilities for securing an



almost unlimited number of the vermin in quick succession. It also takes care of itself, requiring no re-baiting or setting after once put in working order, and is sure

death to its prisoners. A water-tight barrel is the first thing required. Into this pour water to the depth of a foot. Next dampen a piece of very thick paper and stretch it over the top of the barrel (like a drum-head), tying it securely below the upper hoops. When the paper dries it will become thoroughly dry and tightened. Its surface should then be strewn with bits of cheese, etc., and the barrel so placed that the rats may jump upon it from neighboring surface. As soon as the bait is gone a fresh supply should be spread on the paper, and the same operation repeated for several days, until the rats get accustomed to visit the place for their regular rations, fearlessly and without suspicion. This is half the battle, and the capture of the greedy victims of misplaced confidence is now an easy matter. The bait should again be spread as before, and a few pieces of cheese should be attached to the paper with gum. It is a good plan to smear part of the paper with gum Arabic, sprinkling the bait upon it. When dry cut a cross in the middle of the paper, as seen in the illustration, and leave the barrel to take care of itself and rats. The first one comes along, spies the tempting morsels, and with his accustomed confidence jumps upon the paper. He suddenly finds himself in the water at the bottom of the barrel, and the paper is closed and ready for the next comer. There is not long to wait. A second victim soon tumbles in to keep company with the first. A third and fourth soon follows, and a dozen or more are sometimes thus entrapped in a very short space of time.—*Gibson.*

204. To Cook Small Birds.—An excellent way to cook a small bird, such as a peep, is to dress, remove head and legs, and bake it in a hollowed out potato.

CHAPTER III.

FISH AND FISHING.

205. Haunts of Fish.—Remember that fish dwell chiefly in those parts of the stream where the natural current carries the surface food, and that the largest fish select and occupy the best places. In lakes and ponds fish prefer spots where the coldest water is supplied by bottom springs or brooks emptying into the larger body of water.

206. Fish on Clear Days.—Fish are most wary and difficult to capture on still days when the sky is cloudless.

207. Fish on Cold Days.—Fish are sluggish on cold, raw, blustery days, which are usually accompanied by north or east winds.

208. Fish after a Storm or Flood.—Fish won't bite after a storm or a flood, because these events wash plenty of food into the water and they are well supplied.

209. Fish in Spring.—Fish cannot be caught in spring until the snow water is all out of the stream.

210. The Sun's Position in Fishing.—In fly-fishing, fish up or down stream so that the sun shall be in front of you. In bait-fishing, fish down stream.

211. The Moon in Fishing.—Fish are said to bite best between the new moon and the first quarter or between the last quarter and the “change.”

212. Playing a Fish.—Handle your fish with care. Give line when you must and bring him to gaff when you can.

213. Salmon.—For salmon use the best of tackle, rod of split bamboo if possible, click reel and 100 to 120 yards of braided waterproof silk line. Leaders should be 9ft. long, of heaviest gut. Cast the fly as straight and light as possible, allow it to sink a few inches, then draw a foot or two along the surface, and repeat until another cast is made.

214. Fly-Fishing for Black Bass.—It is useless to cast a fly for black bass on perfectly smooth water. Cast the flies as lightly as possible, causing them to settle as quietly as thistle-down. After casting, the flies should be skipped along the surface in slightly curving lines, or by zigzag movements, occasionally allowing them to become submerged for several inches near likely-looking spots. If the current is swift, allow the flies to float naturally with it, at times, when they can be skittered back again, or withdrawn for a new cast. Two or three times are enough to cast over any one spot, when a rise is not induced. When bass are biting eagerly or quickly, whipping the stream is to be practiced; that is, the casts are to be often and rapidly repeated, first to one side, then the other, allowing the flies to settle but a moment. In casting and manipulating the flies, the line must be ever taut; for often a bass will thus hook himself, which he never does with a slack line. It is best to fish down stream, even with the wind against one. Cast just below ripples and rapids, over eddies and pools, along the edges of weed patches, under projecting banks and shelving rocks, near submerged trees or driftwood, off gravelly

shoals, isolated rocks and long points or spurs of land: it is useless to fish long, deep, still reaches of water. The most favorable time for fly-fishing for black bass is during the last hours of the day, from sundown until dark, and also on bright moonlight evenings. On streams, an hour or two following sunrise, in warm weather, is quite favorable. On dark, cloudy and cold days the middle hours are the best. Bright sunny days, especially in hot weather, are not favorable to fly-fishing, except in quite cool, shady and breezy situations. In short, the best conditions are a mellow or dusky light, a good breeze and translucent water; while the most unfavorable are a bright sun, a still atmosphere, and a smooth and glassy surface, with the water either very fine or very turbid. — *Henshall.*

215. “Striking” the Black Bass.—The angler should strike by sight or by touch; that is, he should strike the moment he sees the rise; for the bass has either got the fly in his mouth, has missed it, or has already ejected it, when the rise is seen; it very seldom happens that the rise is seen before the fly is reached by the fish. The angler must also strike at the moment he feels the slightest touch or tug from the fish, for often the bass takes the fly without any break at the surface, especially if the flies are beneath the surface. Striking is simply a twist of the wrist, or half turn of the rod, either upward or downward (upward with stiffish rods, and downward with very willowy ones), which is sufficient to set the hook if the rod and line maintain a proper state of tension; but when the careless angler has a slack line, and, consequently, a lifeless rod, he must necessarily strike by a long upward or side sweep of the rod, called “yanking;” and should he succeed in hooking the fish, the chances are that it will shake the hook out again before the slack can be reeled. The rod must always be held upward, so that it constantly maintains a curve with the

line; and never under any circumstances must the rod point in the direction of the flies after they reach the water, for this allows the direct strain of the fish to come upon the line or leader.—*Henshall*.

216. “Playing” the Black Bass.—When a bass is hooked he must be killed on the rod; the rod must stand the brunt of the contest; the more pliable and springy the rod, the less likelihood of its breaking, for a stiff rod is more pliable than a flexible one. Give the bass more line only when he takes it; make him fight for every inch, and take it back when you can; hold him by the spring of the rod, and do not hesitate to turn the butt toward him to keep him away from weeds, rocks, snags or other dangerous places; this will bring him up with a round turn, and is called “giving the butt.” Don’t be in a hurry to land him; the longer he resists the better for your sport; take your time, and only land him when he is completely exhausted; for if he is well hooked, and the proper tension of the rod and line maintained, he cannot get away; on the other hand, if he is tenderly hooked, the more gingerly he is handled the better. Therefore, never be in a hurry, and never attempt to force matters; always keep a bent rod and taut line; if the bass breaks water, the best plan is to lower the tip, so as to slack the line, and immediately raise the rod and tighten the line when he strikes the water again, for if he falls on the tightened line he is most sure to escape; this is one of his most wily tricks.—*Henshall*.

217. Black Bass Fishing with Minnow.—Use minnow 4 or 5 inches long. Insert the hook in its upper lip and pull it out through the nostril or eye. Use a small braided silk line about 50 yards long and tie a small swivel and the smallest sinker $1\frac{1}{2}$ feet from the hook. Reel up the line as far as possible, grasp the rod with the right hand just below the reel, put the thumb

on the line to regulate it, make the cast and stop the line as soon as the minnow strikes the water. Small minnows may be hooked through the back near the dorsal fin. Don't strike until the bass has had the bait 6 or 8 seconds. Then pull gently, and if he jerks, let him go again; if you feel his weight firm and solid, give a strong pull. Keep the minnow about a foot from the bottom in still waters, and use a float if you wish. In rapid waters keep the minnow near the surface.

218. Black Bass Flies.—1. Flies should be small rather than large. 2. On bright days and with clear or low water flies should be quite small and of subdued dark or neutral tints. 3. For cloudy days and high, turbid or rough water large and brighter flies should be used. 4. For very dark days or from sunset until dark or on moonlight evenings use gray or whitish flies of good size.—*Henshall.*

219. Black Bass Trolling.—Use the smallest spoon you can buy, and tie two or three gaudy flies above it. Row about two miles an hour, use plenty of line and take a course along the edge of the sub-surface water plants, or where the bottom of the river or lake suddenly deepens.

220. Bass in Still Water.—Use but one fly when fishing for bass in still water.

221. Black Bass in Pairs.—Large black bass go in pairs all summer. If you catch one, look out for his mate.

222. Lake Trout Fishing.—Anchor a buoy in deep water, and cut up small fish in pieces the size of a butternut. Scatter the pieces around the buoy for some days, then tie your boat's painter to the buoy, bait your hook with pieces of fish such as you have been feeding the trout with, fish near the bottom and give your line short jerks. Don't bait the buoy the day you fish.

223. Lake Trout Trolling.—Use silver or brass spoon hooks and a sinker weighing $\frac{1}{4}$ lb. to 1 lb., so that the spoon will run near the bottom. Line should be 300 to 500 feet long. Draw and loosen the line occasionally while rowing the boat, and move quite slowly. Troll in very deep water in summer, shallower water in spring and fall.

224. Perch on the Fly.—Yellow perch will take trout hackles of gay colors. Sink the stretcher fly 2 feet below the surface of the water by a buckshot sinker; then draw gradually toward you by several pulls. Use three flies and you will sometimes catch three perch at one cast.

225. Shad Flies.—Where shad can be caught on a fly, modest brown or dun-colored lures are most effective.

226. Rock Bass Fishing.—In May and June rock bass (not "rock fish") are found along the river's edge. In July and August they are caught in the middle of the stream. Use worm or grub bait or minnows.

227. Carp Fishing.—Feed the fish with boiled potatoes, boiled oats or oatmeal in the same spot for several days, then stop feeding for a day or two, after which fish for them with a small trout hook baited with angle-worms, or with the stuff you feed them wrapped in fine lace. Use a float, and sink the bait near the bottom.

228. Carp Fishing.—Never strike while a carp only nibbles. Wait till he drags the float steadily under, and appears to be going away with it; when, seeing all clear and in order about the line and reel for a rush, you may hit him smartly, and if he is a big one "look out for squalls;" as his mouth is very tough and leathery, you may play him firmly. Get him away as soon as possible from your pitch, so as not to frighten the rest, and land him as far from the pitch as you can. Then come back to the pitch, quietly throw in a handful or two of ground.

bait, and follow up with the hook as before, and probably in ten minutes or a quarter of an hour, if the fish are well on, you may see your rush-float "niggle-niggling" again. The best ground bait, of course, for this work is boiled potato.—*Francis Francis.*

229. Carp Fishing.—When I fish for carp I have a fifty-foot line done up on a reel with six or seven small hooks on the line, and without any pole. I bait the hooks with stale light bread, which floats on the surface of the water, and the carp come to the top to suck it down. As soon as they feel the hook they start to run and I reel up the line and play with them until I worry them out and land them without further trouble. After catching one in this way they become very wild and timid, and it is a long time before I can get them to show themselves again. I caught only one with an angle-worm.—*Oscar Reid.*

230. Chumming.—"Chumming" is a favorite method of fishing for striped bass and bluefish. The bait used is menhaden, called sometimes mossbunkers or bony fish. The line should be attached to a knobbed or needled-eyed O'Shaughnessy hook and a turn taken over the upper end of the bait, which is cast to a distance of 75 or 100 feet into the sea, then slowly reeled up again for another cast. The upper part of the menhaden, which is useless for bait, should be chopped very fine and thrown out to attract the fish. This is called "chumming." A thumb stall should be used to prevent injury when checking the fish, which is done by pressing the thumb on the reel with more or less force. When the fish is killed care should be taken to yield to the motion of the surf when reeling in, or the line will break. Use a good long handled gaff for large fish.

231. Fish Oil in Chumming.—To aid in chumming for bluefish get a quart of fish oil and keep it dripping from the boat.

232. Pickerel Trolling.—Trolling for pickerel (and pike) should be done as near the weeds and eel grass as possible with 100 to 125 feet of line, rowing at a speed sufficient to keep the spoon near the surface. Early morning is the best time. When you strike a pickerel or pike you may often strike a second and third by trolling over the same spot several times.

233. Pickerel Fishing Through the Ice.—One man often cuts from ten to fifty holes in the ice at some distance apart, often in different portions of the lake or pond, and baits his lines, usually with a live minnow, and sets his tip-ups to notify him when his presence is needed at some particular hole. The primitive tip-up is

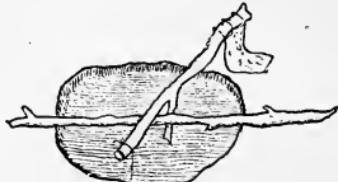


FIG. 1.

shown in Fig. 1. Another tip-up (Fig. 2) is cut from the



FIG. 2.

top of a sapling, which stands erect on its two short legs

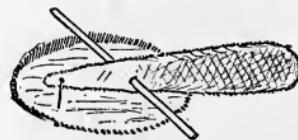


FIG. 3.

when a fish bites. Another device is seen in Fig. 3, the

broad part of the piece of board being painted red. And still another simple contrivance is shown in Fig. 4, a red flag being sometimes attached to the stick. The only objection to these simple tip-ups is that they do not always indicate when a fish has taken the bait but has not been

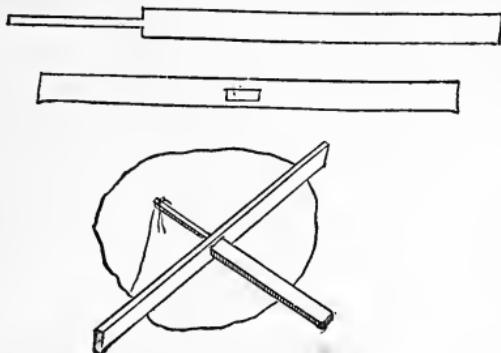


FIG. 4.

hooked, unless the fisherman happens to be looking at the time. Fig. 5, however, causes a flag to be hoisted when

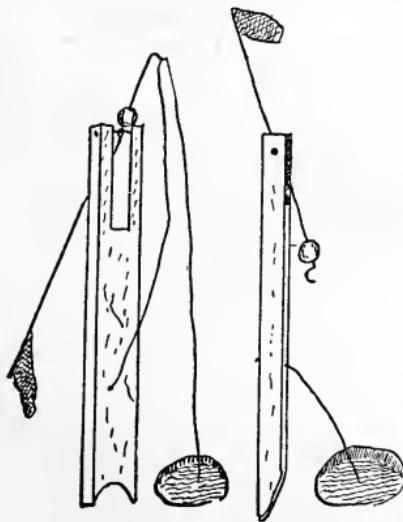


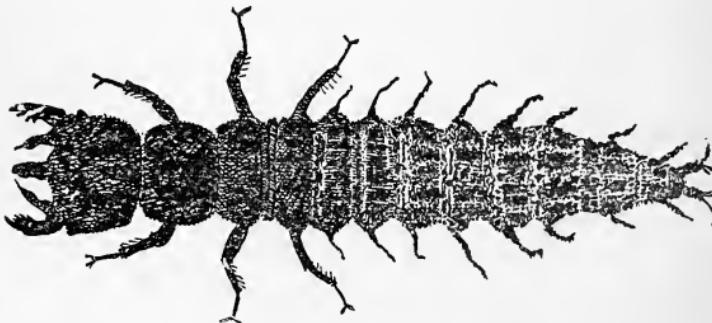
FIG. 5.

the bait has been disturbed ever so little, whether the fish

is hooked or not, a weight (a bullet 15 to the pound) being worked by the fish. The "flagstaff" is made of wire, the rest of pine wood.

234. Bob for Eels (Worms).—Take a piece of small stiff wire, and about a yard of linen thread. Make a double half hitch on one end of the wire and wet the thread. String worms lengthwise on the thread until it is full, then put another length on and continue until you have a dozen or more lengths. Tie the ends together, wind them over your hand, and then tie your fishline to the bunch; add a small sinker.

235. Dobson Bait.—The dobson or helgramite, known by fifty or more different names in different parts of the country, is the larva of the *Corydalis cornutus*



(Linn.), and is found in brooks and swift rivers under stones. It can be captured by putting a landing net below a stone and then lifting the latter. It is an excellent bait for black bass. Keep it off the bottom or it will crawl under stones, and move it constantly. Hook it just below the head, between the joints.

236. Bob for Eels (Meat).—Take a piece of coarse meat and sew this full of linen thread, crossing the thread in all directions. Tie to line with sinker as above. The best time for bobbing is early evening or just before moonrise.

237. Skittering.—Use a moderately stiff rod with a line a trifle longer than the rod. Cast the bait near the bank, grass or lily pads. Move the rod sideways so that the fish will skip like a fish trying to escape. Use minnow or small fish for bait, and hook through the lip.

238. Black Chub Bait.—The black chub minnow is one of the best live baits for black bass.

239. Grasshopper Bait.—Do not use a sinker with grasshopper bait, but let it float on the surface. Use it in very still parts of a stream for trout.

240. Earthworm Bait.—Earthworms or “angle-worms” will catch any fresh-water fish. In salt water only eels and white perch bite freely on them. “Scour” them by leaving them over night in moss. If wrapped in some earth in a stout cloth they can be kept fresh several days, and will be of a bright scarlet color and very lively.

241. Raw Beef Bait.—Raw beef is the best bait for trout in spring before worms can be dug.

242. Mice for Trout Bait.—Obtain a nest of young mice still in the pink and place the hook through the tail of the mouse. This is effective bait in deep ponds or lakes, and is used by farmers’ boys, who attach several mouse-baited lines to shingle buoys, and wait on shore until the shingle signals. The trout thus caught are always large.

243. Home-Made Artificial Bait.—For black bass and trout take the neck and head of a speckled or red fowl; cut the neck off down to the breast, and save the skin with the feathers on. Do not remove them until you want to bait your hook; then cut a strip like a worm and remove the feathers, but do not remove the little bright, glistening hairs. When on the hook it is a most enticing bait, and, being tough, hangs on well and

looks bright. Sometimes you may want a bait like a bug or grasshopper, or a large miller; this you can closely imitate by leaving on one or two feathers. Sometimes a cut from the wattles, near the bill, with a feather or two, or a piece of the comb and a piece of the little feathers attached, will lure a trout when nothing else will.

244. Carp as Bait.—A young carp about 4 inches long makes an excellent black bass bait, being attractive in appearance, lively in motion and capable of living a long time on the hook.

245. Sure Bait for Pike.—One authority recommends a trolling bait made of a piece of mackerel about $1\frac{1}{2}$ inches long and $\frac{1}{4}$ inch broad, cut so as to taper toward the lower end. Hook as near the extremity of the broad end as possible.

246. Shedder Crab Bait.—This favorite bait for salt-water fishing is found at the edge of low water among rocks or sunken logs, frequently sheltered by seaweed or sedge. It is a soft-shell crab whose shell is about as hard as Bristol board. When the shell is removed it has a thin, tenacious skin which can be placed upon the hook so as to show as much as possible of the white flesh. One shedder may be cut into five baits, counting the two claws. It is the cleanest bait to handle, and generally the most acceptable to weakfish, bluefish (still-fishing), cels, blackfish, flounders and porgies.

247. Shedder Lobster Bait.—Shedder lobster is as good a bait as shedder crab, but is high-priced to buy and difficult to obtain.

248. Shrimp Bait.—In any still part of a salt-water river or creek shrimp may be caught by running a hand net (made of mosquito netting in the shape of a landing net) along close to the shore among the sedge. Put them in a can of salt water or a box of damp sawdust and they

will live all day. Put them on the hook from end to end, tail foremost, the point of the hook being concealed, or better yet, impale them on the point of the hook, when they will have freedom of motion. All salt-water fish like shrimp.

249. Sandworm Bait.—Sandworms are found in black sand, especially under some great rock beside the sea or sound at ebb tide. They grow to 14 inches in length, are of a red color, and fringed on either side with *branchiae*, and have a beak which can pinch quite forcibly. Put them in a box with a small quantity of sand, not too much or it will suffocate them. Lay over them a little seaweed, and they will keep for days. For striped bass coil a whole one on the hook in such a way that it will wriggle naturally. For other fish they may be broken in two, only half being used at a time. About New York they are the most successful salt-water bait used. A dead sandworm is useless for bait.

250. Clam Bait.—Soft-shell clams can be obtained at low water by digging in the sand with a short-handled hoe wherever there is a large round hole. The hard portions make the bait, the shells and soft portions being thrown overboard to attract the fish. Blackfish and snapping mackerel are especially fond of soft-shell clams, and other fish which do not swim near the bottom will bite on them.

251. Live Bait.—Use the smallest sinkers and floats possible with live bait. If heavy ones are used they will soon tire and kill the bait.

252. Preserving Minnows.—In cold weather 200 to 300 minnows may be carried for miles in a 3-gallon pail with a close cover, filled $\frac{1}{2}$ with water and $\frac{1}{2}$ with handfuls of clean rye or wheat straw.—*Maine Fisherman*.

253. Preserving Minnows.—To preserve minnows, put a tablespoonful of table salt into each 3 gallons of water.

254. Keeping Minnows in Fruit Jars.—“Pise-co” reports that he has kept two minnows alive in a pint fruit jar two-thirds full of water for 9 days. Two minnows put into a jar of water that was closed air-tight lived 8 days. The jars were set on a shelf in a stable.

255. Preserving Frogs and Crawfish.—Frogs and crawfish may be kept alive some days by packing them in wet moss.

256. Preserving Crabs.—To keep soft-shell crabs, pack them closely together, claws up, in a box, cover with green seaweed or fresh grass; keep cool.

257. Hooking Minnow Bait.—For casting or trolling, hook the minnow through the rim or cartilage of both lips. For still-fishing, use small hooks, and insert the hook through the middle of the back just above the back bone.

258. Minnow Decoys.—Sink a bottle of water with minnows in it—eight or ten to a quart—to attract fish to the spot.

259. The “Whip.”—The leader with its flies is called the whip. The fly at the end is the stretcher, drag-fly or tail-fly; those above are drop-flies, droppers or bobbers. The stretcher should generally be the largest (Roosevelt says the smallest), as, the weight being then at the end, a longer cast can be made and the resistance in drawing it over the surface keeps the leader taut. When casting a short line (18 to 25 feet), the dropper should not be more than 30 inches from the stretcher. When the novice learns to cast well the flies may be 4 feet apart. For the beginner the leader should not be more than 6 feet long. After it may be increased to 8 or 10 feet.

260. Rigging the Cast.—In rigging the cast for fly-fishing, if the leader is provided with loops at each

end, and for drop-flies, proceed as follows: To the small end of the leader attach the stretcher or tail-fly by passing the loop of the leader through the loop of the snell and over the fly, then draw together. Three or four feet from the tail-fly attach the dropper or bob-fly, in the same manner, that is, put the loop of the snell over the loop of the leader, and push the fly through the latter loop and draw tight; or, if the leader is not furnished with loops for this purpose, slip a knot of the leader (about 3 or 4 feet from the tail-fly) apart, and after making a knot in the end of the snell of the fly, put it through the opened knot of the leader and draw together; this will hold firm, and the dropper-fly will stand at right angles from the leader. If, however, the gut lengths of the leader are tied by hard, close knots, instead of the slip knot or double water knot, then the snell of the dropper must be attached close to, and above a knot of the leader, by a single knot or half-hitch, a round knot having previously been made in the end of the snell, to prevent the half-hitch from working loose; this is probably as good and safe a way as any. If the angler wishes to employ three, the third fly, or second dropper, must be attached 3 feet above the first dropper; in this case the leader should be 9 feet long.

261. Knot for Snood Loops.—Hold the cord in the left hand, and with the right hand make first a small (Fig. 1) and then a larger loop (Fig. 2), placing the end of



FIG. 1.



FIG. 2.



FIG. 3.

the cord under the smaller one (Fig. 3). Now insert the large loop through the smaller one from the back at *A* and draw tight.

262. Attaching Droppers.—In tying lengths of gut together to make the leader, when you arrive at the point where it is desired to have a dropper loop, say 30 inches for a fine trout leader, or 3 feet for a heavy trout or bass, from the lower end to which the stretcher fly is looped, double the gut back, making a loop up the leader, lay the other upper strand alongside, as in Fig. 1, then make a curl in them all and pass loop and line gut through, or in other words, make a knot, as in ordinary tying. It will then present the appearance of Fig. 2. Then draw down tight, and having the gut well soaked and soft, take the loop just tied in one hand and the upper end, *C*, in the other, and pull them strongly apart, so that the loop will be pulled down the line. Then, when released, instead of pointing straight up the leader



FIG. 1.

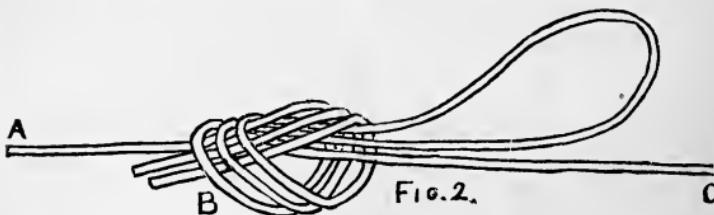


FIG. 2.

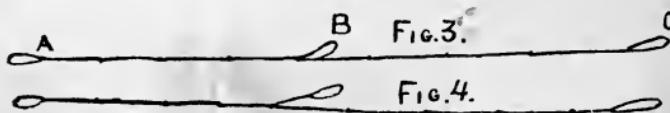


FIG. 3.



FIG. 4.

and lying hard on *C*, it will point out nearly at right angles. The loop is seen on a completed leader in Fig. 3, in which *A* is the stretcher loop, *B* the dropper loop and *C* the upper or reel line loop. This way enables any man, whether he be an adept in making tackle or not, to fasten

on or take off in a moment a dropper as easily as a stretcher. The advantage of tying the loop into the line in this way is that pointing up and being a short stiff loop, the dropper always stands out at a right angle with the line, making it an impossibility for it to foul with the leader; the hook is never curled over the line, so if a fish strikes he gets it into his mouth as easily as the stretcher fly.

263. Wax for Snelling Hooks.—Burgundy pitch 120 grains, white resin 60 grains, tallow 20 grains. Powder and mix the pitch and resin and put into an oven in a pipkin. When melted add the tallow and stir all together. Let the mixture stand twelve hours.—*H. Cholmondeley-Pennell.*

264. Wax for Gut Leader.—Take 2 ounces best resin and $\frac{1}{4}$ ounce beeswax, simmer together in pipkin for 10 minutes; add $\frac{1}{4}$ ounce tallow; continue to simmer 15 minutes; then pour the mass into a basin of cold water and work with the fingers until it is pliable.

265. Snelling or Gimping Hooks.—When the gut is selected cut off the imperfect ends and place it in tepid water until it is thoroughly soaked and soft, then tie the end loop by doubling one end of the gut length and making a common knot in the doubled portion.



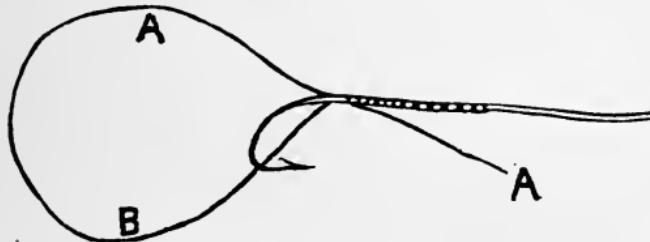
The hook can now be tied on while the gut is soft, or the gut may, by making a knot in one end and using a pin in the loop, be stretched on a board to dry and then

ties. The whipping is the same in either case, but if the gut is whipped after it is dry, the parts to be covered by the silk must be nicked or dented, which is done between the teeth, care being taken not to bite so hard as to split the gut. You will find the whipping equally secure whether the gut is either wet or dry. Another thing you will find makes no difference; that is, whether the whipping begins at the end of the shank and extends toward the bend of the hook or *vice versa*. From tying reënforced snells, one gets into the habit of beginning the rounding at the end of the shank; but if you always fasten the silk with an invisible knot, there is little danger of a fish cutting the knot with its teeth, as has been claimed they will do. A snell is quite apt to become weak or even break just at the end of the shank from contact with it. Some shanks terminate in a veritable point; such are cut off with a pair of cutting pliers and then filed smooth with a fine file, but all hooks larger than No. 3 Dublin, Limerick (O'Shaughnessy), are "reënforced" by making the gut double for half or three-quarters of an inch above the end of shank. The easier way to do this is to make a long loop with a common knot similar to the loop made for attaching the snell to the leader. If one's gut-lengths will not warrant this appropriation, a short piece of gut may be wound on to the shank with the snell, and the free end of the extra piece fastened to the snell with a bit of waxed silk. Having gut-lengths, hooks, wax and silk, wax thoroughly a piece of silk by holding one end between the teeth and the other in the left hand. Holding the hook at the bend between the finger and thumb of the left hand, lay the end of the waxed silk on the shank a little above the point of the hook and take four, five or six turns, according to size of hook, with the silk around shank until the end is reached. Then make three or four turns of the silk close together, just at the ends, so as to completely cover it, as a cushion or shield against the wear of the steel, should it come in

direct contact with the gut. These first few turns of the silk make a spiral ridge around the shank which acts like



the marks on the straight shank when using soaked gut, and with dry gut act in combination with the dents made with the teeth to prevent the steel and gut pulling apart. When the end of shank is covered, lay the gut length on the back of the shank and wind the silk closely and tightly to the point of beginning. Notice the silk as you wind to see that it is well waxed, or wax as occasion demands. When the starting point is reached lay the free end of the silk on the winding with the end toward the end of shank, which makes a loop in the silk, then take the slack of the loop and continue winding for three or four turns, but wind over the free end of the silk. The following diagram will show the manner:



A A, free end of silk turned back on winding. Take slack of loop at *B* and wind over silk, *A A*. Then take free end of silk and draw tight and cut off closely. When the winding or whipping is finished it will be found that the wax has been squeezed to the outside of the silk by the pressure in winding. This must be rubbed smooth with finger and thumb, when it will appear that the silk is nicely coated with the wax. With a camel's hair brush go over the winding with orange shellac and put aside to dry until the alcohol evaporates, leaving a smooth coat-

ing of shellac over the silk and wax. It may be necessary to renew the shellac after a time, but one will have had so much fishing with hooks tied in this manner before it is necessary, that it will be done with thanks for past services. Hooks are tied to gimp in the same way as above described, except black linen thread is used instead of silk, and the loop in the end of the gimp snell must be made by winding the doubled parts instead of tying.

266. Snelling Hooks.—Grasp the hook by the bend in a pair of pliers, and heat the tapered end of the hook in the flame of a spirit lamp till it will melt wax readily. Then give it a coating by rubbing it on a lump of shoemaker's wax. The hook should be hot enough to burn it on, so as to form a smooth, even coat of wax. Then tie on snell in the usual way with waxed silk thread and finish with shellac. An occasional coat of shellac will preserve them till worn out. They will never slip. The object of using the pliers is not only to prevent burning the fingers, but to prevent the heat drawing the temper of the hook above where it is grasped by the pliers.—*N.*

267. Snelling Hooks.—Get a roll of rubber cement such as is used to fasten bicycle tires (it can be procured where bicycles are sold), warm the shank of the hook in a lamp sufficient to melt the cement, then draw the shank of the hook across a piece of the cement and enough will adhere to answer the purpose. Let it cool for a second to prevent it from sticking to the fingers, then press the end of the snell on in just the position you wish it to remain. After allowing the cement to stiffen a little more wrap with good thread, and if you have just the proper quantity of cement and the right consistency the wrapping thread will bury into the cement smoothly; it will be perfectly waterproof and stick to business under all circumstances. The cement also answers well to waterproof thread or cord for wrapping; use as you would cobbler's wax.—*Californian.*

268. Snooding Hooks.—To snood hooks with silk-worm gut, instead of fastening the gut directly to the hook, fasten a small loop of relaid linen line No. 5 to the hook. The loop should be quite small, not over $\frac{1}{8}$ inch. Then prepare the gut by tying a loop at each end, one for attaching the hook through the small loop on hook, the other for attaching the line. Many advantages are gained by this method, the gut is double near the hook, it also forms a flexible joint and avoids the annoyance of chafing or breaking off by being bent short; in case a hook is broken, another can be easily attached to the same gut. Hooks and gut can be carried separately and attached when required for use.—*Californian.*

269. Fly-Casting Lessons.—The novice may try casting on snow or grass without flies or anything beyond a simple knot in the end of his line to keep it from fraying out. The first thing to be impressed is not to attempt long casts; these are for the distant future. Water is by far the best medium to learn to cast upon, for the resistance to the line when retrieving is exactly what he will experience in actual fishing. For the first cast he takes his position where there is no obstacle behind him to interfere with his back cast. It is entirely upon this back cast, or the retrieving of the line that his success depends. It must on no account touch the ground or water behind him. Let him begin with about fifteen feet of line, his rod in an erect position, and then make a forward cast; his elbow close to the body and the movement mainly with the wrist. As the line lies out upon the water, with the rod parallel to its surface, he should draw it back a foot or two slowly, gradually increasing its speed, and then with the spring of the rod send it up behind him with an upward motion of his wrist, stop his rod at nearly a vertical position; then allowing just as much time for the line to be straightened out behind as it occupied in going forward, let him make the cast

again with his wrist and send it forward. He should practice this until he can lay his line straight upon the water in the spot where he wishes it to land. When he has accomplished this to his satisfaction, let him take his left hand and reel off a few feet more line while it lies upon the water and before he retrieves it. The resistance of the water will then draw this extra line through the rings, and he must allow a little more time for the line to get behind him than he did before. He must also bear in mind that his rod must not stand at a greater angle than forty-five degrees behind him, and if he attempts to stop it when it is vertical he will find it will go back to about this angle. It would be well to count one, two, three backward, timing it as a musician counts his beats. As he gets out more line, it will be necessary to draw it slightly nearer him, in order to start it from the water, than when he was making shorter casts; but in all cases he must start it slowly, increasing the speed until he gives it a twitch which sends it back, always bearing in mind that it is the rod which is to do the work by its spring, and not entirely his muscles. The cast of a fly is a sleight which is only to be acquired by practice. Should he fail in giving it time to straighten out behind him, he will hear a snap like the crack of a whip, which, in case he had a fly upon the leader, would be snapped off; yet, should he give it too much time, he will find that the line falls in the water behind him and impedes his cast. A longer cast can be made without flies than with them, as a rule, and only when he attains the proficiency of having his back cast go straight out behind him, and can start it just at that moment when it straightens, without looking behind to see where it is, should he attempt to use the fly. There is a peculiar upward motion of the wrist attained only by practice which sends the fly, instead of straight behind the caster, up into the air, and an expert can do this without danger of catching low bushes, such as alders, etc., which may be

close behind. It is during these early days of practice that the novice will acquire a sleight of hand, good or bad, which will stick to him for a long time. Practicing alone he cannot judge of his faults of style. He should beware of slashing his line forward in the hope of getting it out by main strength; remembering that the elasticity of the rod is the projecting power, and that the physical strength of the caster is a very small factor in sending a fly to a distance. Keeping his elbow close to the body in the beginning will teach him to depend upon his wrist more than upon his arm. A beginner should never attempt to cast beyond twenty-five or thirty feet, until he can lay his line straight and without kink upon the water for that distance. He should pay attention to the falling of the flies upon the water. The first efforts will doubtless be accompanied by a splash. He can, however, soon acquire the trick of checking the line and so regulating the tip of his rod that the flies will fall gently. This is one of the most difficult things to explain, but quite easy to do. It is perfectly possible, at a distance of forty or fifty feet, to cast, check the line, and raise the tip in such a manner that the flies shall alight before the line does. In actual fishing we do not often do this, and it is perhaps more ornamental than useful. In long casts the line will strike the water beyond its middle and gradually follow out until the end is reached, even the point where the leader is joined to the line being in advance of the flies, until this point touches the water, where the flies go on beyond and straighten out to the full length of the cast. The beginner should, by all means, have a friend to watch when the line goes behind him, and caution him to give more or not quite so much time, although it is seldom the latter caution will be used. Our own experience in teaching novices has been that they fail in not giving the line time enough behind them in order to have it perfectly straight and no whip cracking in the rear. In practice haste

should be made slowly, and a certain distance should be well covered and cast with certainty every time before any increase is attempted. Casting with the wind is by far the easiest, and one should begin in this way if there is any wind; afterward he should cast against the wind, when he will find that with a moderate breeze he requires more vim in the cast than he does in the recovery when the wind helps him to get his line well behind. He should by all means learn to cast with both hands, that in actual fishing he may rest one arm by casting with the other, a very great advantage, as he will find in a day's work. No amount of teaching will make him a good caster, practice alone will do this.

270. Points in Fly-Fishing.—Keep your trout line always straight by the motion of the hand, and your fly will keep to the surface whether in still or quick water. In a running stream draw your fly up and athwart the current, sometimes letting it drop down a little. What you want in fly-fishing is motion, always motion.

271. The "Strike" in Fly-Casting.—When you have learned to cast flies with some little skill, try to catch a trout. You will find that casting flies and catching trout are not precisely one and the same thing. You will read in books that the instant you see a rise, strike. Don't do it, at least not yet. For the present, when you get a rise, wait until you feel your fish, then a light strike will fasten it. You are but a beginner and your enthusiasm will very likely cause you to forget the delicate nature of your apparatus. If you strike hard you are likely to break your rod, or if the fish is small you are liable to send him sailing through the air over into the next county. Therefore strike just hard enough to fasten your fish and play him in the water until he turns over exhausted. If he pulls too hard of course you will give him line, but make him earn every inch. When he seems very weary you can reel him in, but look out for his last

break, for every fish, no matter how tired he may seem, will make a final vicious rush for liberty when he is brought near the landing net, and his capers in this last frantic struggle are dangerous and often end in his escape.

—*Kit Clarke.*

272. Casting Against the Wind.—In fly-casting against the wind, lift your line from the water so that it extends behind you at an angle of 45°; then bring your rod down sharply right on to the water, and straight against the wind. This makes the line cut through it and extend out straight on to the water.—*Ira Wood.*

273. Casting Sidewise for Trout.—Casting side-wise is preferred when possible in trout fishing, as the wary trout is easily startled by the motion of the rod in the air.

274. Fly Philosophy.—The insects that are most common about the locality fished are the ones to imitate in artificial flies. Dark days, evenings, and deep or discolored waters, use larger and brighter flies; clear or low water or bright days, use smaller and plain-colored flies.

275. Size of Flies.—Most artificial flies sold are too large. Trout flies, especially, are often so big as to frighten instead of alluring the fish. Bass flies are much smaller now than they were a few years ago, and the tendency is for yet smaller ones.

276. Color of Leaders.—In still water success will be small unless the leader is of the same color as grasses, weeds, etc., that the fish are accustomed to. In brisk water this plan may be followed, or the leader be of “mist” color.

277. Sink the Fly.—Success is frequently had in black bass fishing by attaching a buckshot to the stretcher fly and allowing it to sink about 2 feet below the surface, drawing it gradually toward the boat.

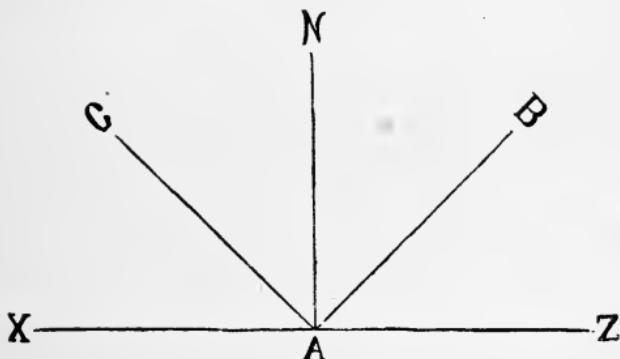
278. Caution in Fly-Fishing.—More caution is necessary in fly-fishing than in bait-fishing, as objects beneath the surface of the water do not frighten the fish so readily as objects on or over the surface. Keep out of sight of the fish, don't let the shadow of your rod or yourself fall on the water, and keep as motionless as possible.

279. Landing Net for Fly-Fishing.—For fly-fishing a short-handled net is the best, and should be as light as possible. Those with wooden rims are as good as any, though the folding ring nets are more convenient and portable. The net should be of good depth, and of rather coarse mesh. When the fishing is done from a boat, the long-handled net is preferable, but when fishing a stream by wading, or from the bank, the short-handled net is more easily carried, and answers every purpose better than the long one.

280. Fly-Fishing in Smooth Water.—In clear, smooth water, let the fly sink a little, then move it with a quick motion.

281. Minnow Casting.—In casting for black bass, having properly adjusted the rod, reel and line, tie on the swivel by one of its rings, and loop the snell of the hook through the other; run the point of the hook through the under lip and out at the nostril of a good sized minnow, say 4 inches long, reel up the line until the swivel touches the tip and make a cast. The angler is supposed to be standing at *A*, facing *N*, and his shoulders in a line with *XZ*. Casting the minnow is an entirely different process from casting the fly. A minnow can be cast but a very short distance immediately in front of the angler, and all long casts must be made sidewise, that is, to the left or right. To make a long cast to the left we will suppose *X* to be the objective point to which the minnow is to be cast. The angler now grasps the rod immediately below

the reel with the right hand, with the thumb resting lightly but firmly upon the spool; the right arm is now extended downward, slightly bent with the elbow near the body, and with the extreme butt of the rod nearly touching the right hip; the thumb and reel are upward, inclining slightly toward the left; the tip of the rod, or rather the minnow, just clears the ground or surface of the water; the position of the rod is now in the direction of the line *A B*, inclining toward the ground or water, making an angle of about 45 degrees with the line of the



shoulders, *XZ*; this is the situation at the beginning of the cast. Now for the cast: The angler turns his face toward *X*, the objective point, looking over his left shoulder without turning his body; he now inclines his body in the direction of *B*, advancing the right foot and bending the right knee slightly, and makes a sweeping cast from the right to the left, and from below upward, across the body diagonally, until the rod hand is at the height of the left shoulder, and the arm and rod extended in the direction of *AC*, with the tip of the rod inclining upward. The movement of the right hand is almost in a straight line from a point near the right hip to a point near the left shoulder; the motion in casting is steady,

increasing in swiftness toward the end of the cast, and ending with the "pitching" of the bait—instead of a violent jerk—somewhat similar to the straight under-hand pitching of a base ball. In making the cast, the right elbow should touch the body, sweeping across it, and only leave it at the end of the cast, making the fore-arm do the work. At the end of the cast the reel and thumb are upward, and the rod forms an angle of 45 degrees with the line of the shoulders XZ , and the minnow instead of following the direction of the rod AC , as some might suppose, will diverge toward the left, and drop at X , when the thumb should immediately stop the reel by an increased pressure. Casting to the right is just the reverse of the above proceeding. The angler being in the same position, brings the right hand across, and touching the body, to a point in front of the left hip, the thumb and reel upward, but inclining toward the body, and the rod extending in the direction of the line AC , with the tip downward; he now turns his face in the direction of the objective point Z , inclines his body and advances his left foot in the direction of C , and makes a cast from left to right, and from below upward, and ends the cast with the right arm and rod fully extended in the direction of the line AB , while the minnow takes its flight toward Z . In making a cast to either left or right the body should sway or move slightly in the direction, and simultaneously with the rod arm; it will give force and steadiness to the cast; but on no account must the body be turned around or the feet moved during the cast; let us be graceful if we cannot be proficient. The first cast that the beginner makes will be likely to throw the bait behind him; this will be because he will not end the cast in time, but carry the tip of the rod too far toward the line XZ . He should by all means begin by making short casts, and lengthening them as he perfects himself by experience in managing the reel and controlling the cast.—*Henshall.*

282. Position of the Reel.—The weight of a reel naturally causes it to turn to the bottom; hence when it is placed there it is quiescent and requires no strain of muscle to keep it in position. A reel on the bottom of a rod held in the left hand comes in position to work the crank with the right when needed. When the fish is likely to demand the whole spring of the rod then of course he is not being reeled in. A heavy reel on top or on the side of a rod keeps twisting to get below.

283. Swelling of Rod Joints.—The swelling of the joints of a rod can be prevented by rubbing them with mutton tallow and loosening them every night. Use the same precaution with reel bands.

284. Tight Joints in a Rod.—To loosen the tight joints of a rod heat them with a lighted match.

285. Putting Away Rods.—Rods should be rubbed with a cloth and hung up or laid out straight.

286. Broken Rod Guides.—When a guide on your rod breaks supply a new one immediately and thus save a broken rod.

287. Varnish for Rods.—Thin down coach body varnish with spirits of turpentine until you can apply a coat so thin that no brush marks show. Hang the rod then in the wind and sun, and when perfectly dry apply another coat. Three or four coats will suffice.

288. Varnish for Rods.—At the beginning of the season clean all the metal parts with rottenstone and sweet oil, but never touch the male ferrules. Then with a piece of old fine felt, a little extra fine pumicestone and raw linseed oil rub it down thoroughly, being careful in the wiping not to chafe the silk; wipe off very clean and let it stand for a day or two to get dry. Then take a fine-haired flat brush and with hard oil finish give one coat, suspend the rod by strings for one or two

days and give the secoad coat, and suspend again for five days or more and let it get hard. Now take old felt, raw oil and rottenstone and rub it lightly, but thoroughly; wipe off with an old rag and you will have a handsomely finished rod. Water will not affect it. When you quit fishing wipe the rod dry, and when you get home or to camp rub it well with raw oil on a rag and oil the male ferrules with a drop of good gun oil, polish your mountings, place in a partition bag and hang up in a cool place. If you tie the bag tie it loosely.—*W. S. S.*

289. Varnishing Trout Rods.—Highly varnished trout rods no doubt scare many fish. A rod of dull tint is preferable.

290. Dyeing Lines.—To dye blue, soak in indigo water; the stronger the dye the deeper the color. To dye green, soak in a strong decoction of green tea. To dye brown, soak in strong coffee.

291. Dye for Leaders.—Dye leaders used in clear water with the juice of milkweed, or equal portions of Arnold's fluid (ink) and water. To dye green use Arnold's fluid "straight."

292. Preserving Gut.—Silkworm gut will keep nicely if laid full length in paper slightly oiled and the rolled gut and paper placed in chamois skin.

293. Rusted Gut.—When gut comes in contact with the hook it will frequently rust, making a weak spot. To prevent this wrap the hook first with silk or thread so closely that when the gut is afterward wrapped on it will not touch the hook.

294. Fractured Gut.—Tests made by "Piseco" demonstrated that when a length of gut leader has been once broken by a strain it is so weakened by the force of the strain that it is injured through its entire length, and is worthless thereafter.

295. Soften Silk Gut.—Soak for some hours in strong vinegar.

296. Soften Snells.—Snells should not be used until softened, the same as a leader.

297. Waterproofing a Linen Line.—Saturate with fine paraffine dissolved in pure benzine. It will be well preserved and will render well through the guides.

298. Waterproofing a Silk Line.—Soak it in boiled linseed oil, and strip off superfluous residue by drawing the line through the thumb and finger. Singe off frayed fibres.

299. Waterproofing a Silk Line.—Take 2 parts boiled linseed oil and 1 part best coach-body varnish mixed together and warmed until it will singe a feather. Soak twice and rub once, the mixture being at a temperature not exceeding 100° Fahr. Finish and polish with paraffine candle.—*H. P. Wells.*

300. Kinking Lines.—The kink in a line can be removed by dragging it at full length for some time in the water astern of a boat.

301. Moths in Fly-Books.—Fly-books should be frequently examined to see that no moths are destroying them.

302. Preserving a Net.—To preserve a landing net, soak it thoroughly in linseed oil; shake it, and hang up in the sun to dry. Shake off the drops of oil as they collect on the net until it is dry.

303. Cork Floats.—With a sharp knife cut a longitudinal slit half way through a large bottle cork, and draw the line into the slit tightly.

304. Sheet-Lead Sinkers.—If you carry with you some sheet-lead you can always make a sinker just the weight you desire by wrapping it around the line.

305. Carry a File.—A small file is a handy tool on a fishing excursion. Many fish are lost because the point of a hook is dull.

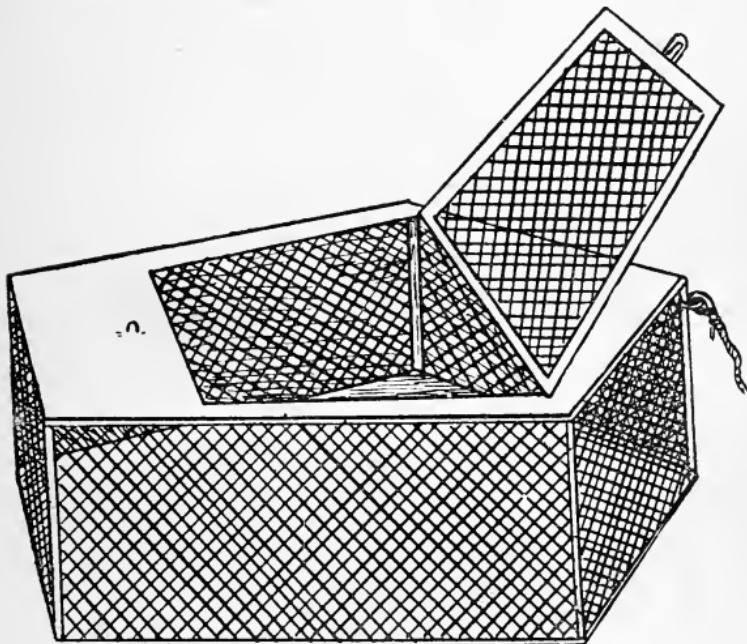
306. Adjuncts to Fishing Outfit.—Besides a file it is handy to have a small hand vise to hold your hook while filing its points or while wrapping on a snood. Pliers are useful, so are cutting pliers and oil for reel and swivels; also silk for wrapping, wax and shellac.

307. Pocket Minnow Net.—Take a bung or round block of wood of $2\frac{1}{2}$ to 3 inches in diameter and bore four holes opposite to each other in the edge of it. Then insert a piece of umbrella rib, about 12 to 14 inches long, in each hole. The holes must be made deep and small enough for the wire to fit tight. The paragon wire is the best. Leave the end of the rib that has the little eye in it outside. Lay the bung and wires on a square piece of mosquito netting and stretch it and sew it firmly at the four corners to the eyes in the ribs. In the center of the bung put a screw-eye, and in the center of the mosquito net sew a piece of string, leaving ends about 8 inches long. Any straight, stiff stick picked up on the shore serves as a handle, being made fast to the net by a strong piece of twine through the screw-eye, and with a piece of bread tied in the net with the string, and perhaps a small, flat stone to make it sink, it is ready to catch minnows. They will come over the net for the bread, and when it is raised up quickly, the resistance of the water causes it to belly, and the minnows will not get out. When bait enough has been taken, pull the wires out of the holes, drop the bung into the net and roll it up on the wires.—*E. A. R.*

308. Fishing Raft.—Make a crib of pine or other light wood logs, say 8×10 feet. Cover the top with 1-inch or $\frac{1}{2}$ -inch boards. Take a box 10×20 inches, bore small holes in the bottom and sides; nail a strip on each side of the box near the top so that they project about 8 inches beyond.

the box on both sides. Cut a hole in the raft the size of the box, put in the box, which will fill with water and rest on the strips. Put the live fish in the box.

309. Live-Bait Boat.—Make top and bottom pieces of half-inch pine. Cut an opening in the top conforming to the shape of the boat, as in cut, or a square opening will answer. Connect top and bottom pieces with up-



rights. Make the sides of one piece of wire-cloth nailed on with broad-headed galvanized nails. Make a wire-cloth door for the top, swinging on two staples for hinges. A hoop and staple to fasten the door and a ring in the stem piece to attach the tow-line complete the boat.

310. Permanent Fish Box.—When camping and desiring to save the biggest fish to take home, have some wire screening 5 feet wide, drive stakes strongly in 2 feet of water, put the screening around the stakes and press it into the sand at the bottom of river.

311. Kill Fish when Caught.—If killed as soon as caught fish will keep longer, and the flesh will be better than that of those allowed to die slowly.

312. Killing Fish.—To kill a fish when caught, put the thumb into the gill and break its neck; or hit it a smart rap on the back just behind the head with a stick or knife handle.

313. Holding a Lively Eel.—To hang on to a lively eel while removing the hook from his mouth, grasp his body with the middle finger over him and the first and third fingers under him. Press upward with the first and third fingers, downward with the middle finger.

314. Skinning Eels.—To skin an eel, rub the tail under the foot until the skin splits, then draw the skin off over the head. This takes out all the fin bones.

315. Skinning Eels.—To skin an eel, roll him first in ashes or dust so that his skin won't be slippery. Then cut the skin around the neck near the head, make a longitudinal slit half the length of his body, and grasping the skin firmly near the head peel it off over his tail.

316. Comparative Weights of Fly-Rod Material.—Mr. H. P. Wells has prepared the following table:

Material.	Specific Gravity.	Weight of one Cubic Foot.
Snakewood.....	1.3718	85.74
Bethabara.....	1.2140	75.98
Greenheart.....	1.0908	68.18
Lancewood.....	1.0335	64.59
Split-bamboo, 6-strip, hexagonal, rind outside.....	0.9915	61.96
Split-bamboo, 4-strip, rind inside.	0.9678	60.49
Ironwood (hornbeam).....	0.8184	51.15
Hickory.....	0.7963	49.78
Ash.....	0.7786	48.66
Mahoe.....	0.6307	41.29
Cedar.....	0.6396	39.98

317. Size and Weight of Fish.—The following table gives the approximate weights of certain fish according to their length:

LENGTH.	WEIGHT.			
	Salmon.	Trout.	Grayling.	Pike.
Inches.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
9	...	0 4 $\frac{1}{4}$	0 4 $\frac{1}{2}$	...
10	...	0 6 $\frac{3}{4}$	0 6 $\frac{1}{4}$	...
11	...	0 9	0 9 $\frac{1}{4}$	...
12	...	0 11 $\frac{1}{4}$	0 10 $\frac{3}{4}$	0 8 $\frac{1}{2}$
13	...	0 14 $\frac{1}{4}$	0 13 $\frac{1}{2}$	0 11
14	...	1 1 $\frac{3}{4}$	1 1	0 13 $\frac{3}{4}$
15	...	1 6	1 5	1 0 $\frac{3}{4}$
16	...	1 10 $\frac{1}{2}$	1 9 $\frac{1}{2}$	1 4 $\frac{1}{4}$
17	...	1 15 $\frac{1}{4}$	1 14 $\frac{1}{2}$	1 8 $\frac{1}{4}$
18	...	2 6	2 5	1 13
19	...	2 12 $\frac{1}{2}$	2 10 $\frac{1}{2}$	2 2
20	...	3 4	3 1 $\frac{1}{2}$	2 7 $\frac{1}{2}$
21	...	3 12 $\frac{1}{4}$	3 9 $\frac{1}{2}$	2 13 $\frac{3}{4}$
22	...	4 5 $\frac{1}{4}$	4 2	3 4 $\frac{3}{4}$
23	...	4 15 $\frac{1}{4}$	4 11 $\frac{1}{4}$	3 12 $\frac{1}{4}$
24	5 6 $\frac{1}{4}$	5 10 $\frac{1}{2}$	5 5 $\frac{1}{2}$	4 4 $\frac{1}{2}$
25	6 1 $\frac{1}{2}$	6 5 $\frac{3}{4}$	...	4 13 $\frac{1}{2}$
26	6 13 $\frac{3}{4}$	7 2 $\frac{1}{2}$	...	5 1 $\frac{1}{4}$
27	7 10 $\frac{3}{4}$	8 0	...	6 1 $\frac{1}{2}$
28	8 8 $\frac{3}{4}$	8 15	...	6 13
29	9 8	9 14 $\frac{3}{4}$	...	7 9
30	10 8	10 15	...	8 6
31	11 9 $\frac{3}{4}$	...	...	9 3 $\frac{3}{4}$
32	12 12 $\frac{1}{2}$	...	...	10 2 $\frac{1}{2}$
33	14 0	...	...	11 2 $\frac{3}{4}$
34	15 5 $\frac{1}{4}$	...	...	12 2 $\frac{3}{4}$
35	16 12	...	...	13 4 $\frac{1}{2}$
36	18 3	...	...	14 7 $\frac{1}{2}$
37	19 12	...	...	15 11 $\frac{1}{4}$
38	21 6 $\frac{1}{2}$	...	...	17 0
39	23 2	...	...	18 6
40	24 15 $\frac{1}{2}$	...	...	20 0
41	26 14	...	...	...
42	28 14 $\frac{1}{4}$	...	...	...
43	31 0	...	...	...
44	33 3 $\frac{3}{4}$	...	...	...
45	34 8 $\frac{1}{2}$	...	...	...
46	37 15 $\frac{1}{4}$	...	...	...

318. Preserving Trout.—Clean and wipe dry. Sprinkle corn meal on the inside. Pack in meal in a tight box.

319. Size and Weight of Black Bass.—Small fish weigh less in proportion to their length than larger ones. From some memoranda the following table of relative lengths and weights of black bass has been prepared, the lengths being from nose to end of tail fin:

<i>Length.</i>	<i>Weight.</i>
	<i>Lbs.</i> <i>Oz.</i>
8 inches.....	8
9 " 	11
9½ " 	15
10 " 	1 2
10½ " 	1 6
11 " 	1 8
11½ " 	1 12
12 " 	2
13 " 	2 4
14 " 	2 10
14½ " 	3 2
15 " 	3 8

320. Size and Weight of Black Bass.—List of measurements of small-mouthed black bass, taken in the month of May (at the Bass Islands, Lake Erie), when they are in prime condition:

<i>Length.</i>	<i>Girth.</i>	<i>Weight.</i>
12 inches.....	8 inches.....	1 pound 6 ounces.
14 " 	11 " 	2 " 6 "
15 " 	11½ " 	2 " 14 "
20 " 	13 " 	4 " 5 "
20 " 	14½ " 	5 " .. "
21½ " 	16½ " 	6 " 8 "

321. Fish Lie Preventive.—Carry with you a small scale to weigh your fish.

322. Preserving Trout.—Trout carefully dressed may be preserved several days fresh and sweet, without ice or salt, by wrapping them in the long white moss found in the swamps in the vicinity of the lakes and streams where trout are caught, and placing them in a cool shady place; a hole in the ground covered over with a foot or more of earth is a good place.—*Ferris.*

323. Anglers' Knots.—Bow-

line Knot.—This knot is used in making loops in the ends of casting lines, and for many other purposes where a knot is required that will not slip.

**324. A Good Knot for Casting Lines.**—Be sure both ends of each knot come out the same side of

the loop, and that one knot is exactly the reverse of the other. Make each knot tight and pull them together and nothing can make it slip.

325. How to make a Fly Loop in a Casting Line.—First make an ordinary slip knot in the line and draw it tight. Then take the bight of the line close to

the knot, make a half hitch (2) and slip it over the slip knot (1) below the loop and tight knot, and draw tight. The slip knot loop will not then draw out and will remain the size required.

326. How to attach the Reel Line to the Casting Line.—When this knot is

drawn tight the end of the reel line should stick out about $\frac{1}{2}$ inch. To untie this knot pull the short end of the reel line down toward the casting line, holding the reel line tight until the line is straight. Then slip the casting line off with thumb and forefinger nails.



327. How to attach Flies or Lines.—(Fig. 1.) To loosen the knot push the loops back on each other first. Another method easy to understand from the drawing is shown in Fig. 2. Perhaps the best of all is



FIG. 1.



FIG. 2.



FIG. 3.

that of passing the end of the reel line up through the leader loop, then bring the end of the reel line back on itself and tying a bow knot. When drawn taut it will slip down close to the leader loop (Fig. 3) and stay securely in place. A jerk on the loose end of the reel line frees it at once.

328. Gut Must Never be Used Dry.—Soak it in water until it becomes pliable or it will be fractured.

329. Stocking Trout Streams.—Trout eggs must be deposited and kept in a current of water. A mere change of water is not sufficient. The temperature of the water should not be above 50° and not below 35°. They will hatch in 45 to 50 days. Put the eggs in shallow water on a bed of gravel which is kept clean and bright by the current, and as far upstream as possible. Trout will thrive in water which never rises above 65° or 70° in temperature.

330. A Fish Stringer.—The stringer consists of a leather strap, to which are attached wire snaps. It is used as follows: The leather loop is passed around a seat or otherwise made fast to the boat. The free end of the stringer, with the snaps attached, is thrown over-



board. The wire loops are kept on an extra snap in the boat. When a fish is taken the loop hook is passed through both (remember both) lips of the fish and the end sprung into the keeper. The fish is now held by the wire loop; the end of the stringer is taken from the water,

the loop-ring placed in one of the snaps, and the fish, now secured, is placed in the water. Thus one after another may be added to the string, each independent of the other. When wading, the stringer and wire loops may be fastened to the belt, and the free end of the stringer allowed to trail in the water.

331. Hooks.—The Kirby hook is bent to one side at the curve (Fig. 1). The Limerick hooks (Fig. 2) are of superior temper. The O'Shaughnessy (Fig. 3) is of best temper, carefully made, and has a straighter shank with



FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.

less “bulge” at the curve than the Limerick. The Sneck hook (Fig. 4) is bent much like the letter **U** and is also bent to one side at the curve. The Limerick and the O'Shaughnessy are most used for fly-tying.

332. Trout Food.—Suspend a head of a calf or sheep over the pond, and when the meat becomes ripe in the sun, worms will drop off.

333. Bleeding Fish.—Fish bled in the tail bleed more freely and die quicker than when bled in the gills.

CHAPTER IV.

CAMPING AND OUTING.

334. Wind Indications.—When objects at a distance, usually indistinct, loom out clear and distinct, bad weather and changes of wind are coming. Green-colored sky means unsettled bad weather with wind. Wherever the wind is at the vernal equinox (March 21 and thereabouts) there the wind will prevail for the next three months. Crows, before gales, tumble and pitch in the air and croak instead of the usual “*caw*.” Red tinged clouds high up at evening are followed by wind.

335. Fair Weather Indications.—If at night there are few stars, and those very bright and sparkling in a pale, steely sky. If swallows fly high. If just before sunrise the sky is a dull gray and the sun rises clear, gradually dispersing the vapors. If, after a rainy day, the sunset sky is suffused with a magnificent streak of crimson (not copper color). If there is a rainbow at night. If there are mists at evening over low-lying ground or near a river. If a mist in the morning clears off as the sun gets higher. If there is a heavy dew in the evening. If, after a rain, drops on twigs fall and the branches dry quickly.

336. Rain Indications.—On a fine day if dust suddenly rises in a revolving spiral column. If stars are unusually numerous and the Milky Way very clearly defined, with surrounding sky dark. If there is a misty

appearance over the stars. If field sparrows wash vigorously in a puddle. If the woodpecker (usually a silent bird) becomes uneasy and continually cries "yoo, yoo—yoo, yoo, yoo." If domestic fowls keep out feeding when rain begins to fall it will continue; if they run at once to shelter it will be a short shower. If flies are persistently troublesome, look out for thunder as well as rain. If swallows fly close to the ground. If before sunrise the sky is suffused with red (except in frosty weather). If the sun late in the day shines through a gray watery haze it will rain during the night. If the sun at setting has a tinted halo around it. If the moon has a halo around it, especially if some distance from it. If there is a rainbow in the morning. If small dark clouds float below lighter ones, moving faster than the latter. If in the morning there are low-hanging, smokelike clouds. If there is no dew in the morning. If after a rain drops still hang on the twigs instead of immediately drying. Damp stones indicate rain or heat.

337. Camp Outfit.—Go light as possible. In camp outfit, be governed by your ability to carry it. I have made a successful and entirely satisfactory expedition with a tin cup and pocket knife. Meat can be broiled on a stick. Flour can be transferred into a dough in the hollow of a clean piece of bark and baked on a flat stone, a chip or a piece of bark, before the fire, but a cup is positively needed for the coffee. Under such circumstances the addition of a frying-pan, enables one to revel in positive luxury. In it you fry your meat, bake your bread, and can make your coffee. The tin cup is then superfluous. After the necessities add anything you want and can carry. In provisions, bread, meat and coffee are important, though not indispensable. It is more comfortable to have them, and unless you are a first-rate rustler it is quite essential that you have plenty of something.—*W. N. B.*

338. Clothing for Camping.—Felt hat, flannel shirt, handkerchiefs, easy shoes, hosiery, overcoats (rubber and woolen), rubber boots, stout suit of clothes.

339. Cooking Utensils for Camping.—Broiler, camp stove (not necessary, but handy), can opener, coffee pot, forks, frying-pan, iron pot, knives, pepper box, spoons, tin cups, tin pails, tin plates, water pail.

340. Provisions for Camping.—Bacon, butter, canned goods, coffee, corn meal, crackers, Dutch cheese, eggs, flour (self-raising), hard tack or pilot bread, lard, lemons, mustard, oatmeal, onions, pepper, pickles, potatoes, rice, salt, salt pork, sugar, tea, vinegar.

341. Miscellaneous Articles for Camping.—Bandages, belt, blacksmiths' pliers, blankets, candles, cathartic pills, comb, compass, corkscrew, court plaster, fishing tackle, fly repellent, gimlet, guns and equipments, hatchet, Jamaica ginger, kerosene oil, knife, lantern, liquor (for medicine), map, matches, mirror, mosquito net, nails, needles, pins, pipe, postage stamps, rope, salve, saw, scissors, soap, tent, thread, tobacco, tooth brush, towels, twine, writing materials.

342. Camp Site.—Select the highest and driest spot, put a good fire on the swamp side, and, if possible, let trees intervene. When camping in a tent, dig a trench all around it to catch the rain and carry it away from camp instead of into the tent.

343. Camp-Fire.—We first felled a thrifty butternut tree 10 inches in diameter, cut off three lengths of 5 feet each, and carried them to camp. These were the back logs. Two stout stakes were driven at the back of the fire, and the logs, on top of each other, were laid firmly against the stakes. The latter were slanted a little back, and the largest log placed at bottom, the smallest on top, to prevent tipping forward. A couple of short, thick sticks were laid with the ends against the bottom

logs by way of fire dogs; a fore stick, 5 feet long and 5 inches in diameter; a well-built pyramid of bark, knots and small logs completed the camp-fire, which sent a pleasant glow of warmth and heat to the furthest corner of the shanty. For nightwood we cut a dozen birch and ash poles from 4 to 6 inches across, trimmed them to the tips, and dragged them to camp.—*Nessimuk*.

344. Care of Camp-Fires.—When you break camp always extinguish the camp-fire.

345. Shelter for the Night.—He is a poor woodsman who in a forest of any kind cannot very quickly provide himself with shelter from rain or snow. It may be of palmetto leaves, of branches of trees or of bark from the trunk of a tree. The favoring trunk of a tree may keep off the storm, or in a rocky country a shelter can often be found under a projecting ledge or in a shallow cave. A good thing always to carry along is a rubber poncho for each person. It is good to roll around the bedding when *en route* to protect it from wet and dirt; or to put over one's shoulders when traveling in rain or wet snow. When night comes, if the ground is wet and the heavens dry, spread it under your bed. If the reverse, reverse it. With two small stakes at opposite sides of a bed for two, to support two corners of a poncho, the other two corners being stretched backward and held to the ground by a couple of stones or chunks of wood, a very good shelter is provided for your heads and shoulders. Then another poncho spread over the blankets to your feet, and you two can sleep blissfully through any ordinary rainy night.—*W. N. B.*

346. Shed Camp.—A water-tight camp may be made of fir boughs, or even hemlock, by making the roof steep, and lapping the boughs on thick, in courses, with the butt up. The form of the framework may be in several ways. I will mention only two: First, cut poles

with crotch at upper end, 10 or 12 feet long, say six or eight of them. Stick the top crotches together, and spread the bottoms to any desired diameter—according to the size of your party—in a circle; then commence to spread on the boughs, beginning at the bottom, and carefully and thickly lapping them to the top, leaving a parting between two poles for a door. This is also the Indian method, and is called a wigwam. Second, cut two poles 7 or 8 feet long, with crotch at top. Stick these in the ground, butt down, as far apart as you wish the length of your camp to be; say, for four men, make your camp 10 feet long, and more or less according to your number. The two corner stakes being fixed, cut a pole reaching from one to the other for a ridge pole, then cut shorter poles to reach from your ridge pole to the ground, and put them near enough together to hold the covering, be it boughs or bark.—*J. G. Rich.*

347. Camp Lodge.—Find two large trees far enough apart for the length of your camp, cut notches in each of the trees as high as you wish your ridge pole to be, say 7 feet, more or less. Place your ridge pole in these notches, and withe it solid to the trees. Be sure the pole is stout enough; then roll up a good heavy log for the back of your camp. Split firs or cedar trees in halves to the desired length, and place them, the lower end on the log at the back of camp and upper end on your ridge pole, in the following manner: Lay two half logs flat side up, and another flat side down, lapping on each, and so on over the whole. Stand splits on end to cover end of camp. This is the same form as the temporary bough camp, and by covering two together, will make a very durable, tight camp for winter or summer. If for cold weather, throw on plenty of green boughs over the splits, to stop all air holes.—*J. G. Rich.*

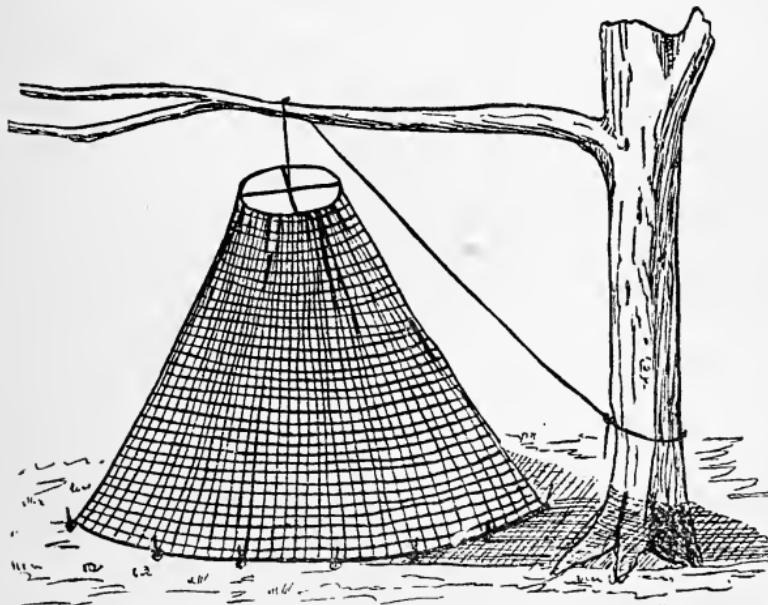
348. Sleeping Out.—When outdoors always sleep on the earth for comfort. Make your bed there as com-

fortable as time and circumstances will permit. If the ground is cold, or wet, or covered with snow, you must provide some kind of a foundation. It may be of hay, straw, weeds, brush, corn stalks or fence rails, but in any event stick to the ground. Don't roost on a perch like a chicken and get every breath of air that blows and chills you from every side. Balsam fir boughs make the best bed of all beds; the tips broken off short and laid shingle fashion, bottom side up from head to foot. All the firs, hemlock, juniper, cedar and pine may be substituted in the order named as to choice. Cherry, willow, alder or any such shrubs follow next. If the ground is smooth and dry, and it can generally be so found in this western country, it is plenty good enough. Use only woolen blankets for bedding. Under any circumstances, when camping, try to so provide yourself as to sleep warm, and the nearer you get to the ground the easier that is accomplished.—*W. N. B.*

349. Sleeping Bag.—Mr. C. S. Farnham, a well known canoeist, has devised for camping in cold weather a sleeping bag, or quilt and cover. The quilt, when extended, is nearly heart-shaped, being 7 feet long and 7 feet at the widest part. The small end does not come quite to a point, but an oval end piece is sewn in. The quilt is made of silk or silesia, stuffed with $2\frac{1}{4}$ pounds of down, evenly quilted in, the edges being strengthened with a binding of tape. Around the edges are buttons and button-holes, by which the quilt may be converted into a closed bag, in which a man may sleep warmly in the coldest weather. A cover of the same shape is made of fine muslin, coated with boiled oil, and being provided with button-holes, may be buttoned closely, keeping off entirely the dampness of the ground or even rain. The entire weight of the quilt is $4\frac{1}{4}$ pounds, and of oiled cover 2 pounds 6 ounces, and both may be rolled into a very small bundle for stowage. The amount of covering may

be regulated to suit the weather, the camper sleeping with either oiled cover, quilt, or both over him, or if very cold, rolling up in both.

350. Mosquito-Proof Tent.—The top is formed with a light hoop, about 2 feet in diameter, covered with muslin like the head of a drum. Two strong pieces of tape are sewn from side to side of the hoop, crossing each other at right angles, and at the center where they meet is



attached a thin rope about 10 feet long. To the muslin at the rim of the hoop is sewn a quantity of coarse cheesecloth or "tarletan," descending so as to form a bell 6 feet in height and 8 feet in diameter at the ground. Around the lower edge, at intervals of 2 feet, are small tape loops for pegging out wide when two or three people wish to sit inside. The whole article weighs only about 2 pounds, and can be folded flat so as to go inside a bag when traveling. When required for use the rope at the top is thrown across the branch of a tree and drawn up just enough to

let the lower edge of the cheesecloth or "tarletan" rest on the ground. Danger from fire can be avoided by soaking the screen in a solution of tungstate of sodium.—*J. J. M.*

351. Camp Spring Bed.—Take coarse cloth 6 feet or 7 feet square. Sew the edges together. Place two logs, 10 or 12 inches in diameter, on the ground 7 or 8 feet apart. Cut two poles 10 or 12 feet long; pass them through the cloth and let them rest on the logs. Cut notches in the logs to keep the poles apart and at a sufficient distance to keep the cloth stretched to its fullest width. Stuff the cloth bag with leaves, grass or browse, and you have a soft spring bed.

352. Head Mosquito Net.—Make some tarletan into the shape of a bag, open at both ends, from 15 to 18 inches long and 2 to $2\frac{1}{2}$ feet in circumference. A piece of fine elastic cord is run in the hem at the top to clasp the body of the hat, while a similar cord in the hem at the bottom secures it around the neck. The hat rim keeps it out of the face. If a low-crowned hat is worn the bag may be closed at the upper end.

353. Mosquito Gauntlets.—Sew linen cloth cuffs to the wrists of a pair of gloves, and run an elastic cord in the hem at the top of the cuff to clasp the arm underneath the coat sleeve.

354. Insect Dope.—Make a preparation of 3 ounces sweet oil and 1 ounce carbolic acid. Let it be thoroughly applied upon hands, face, and all exposed parts (carefully avoiding the eyes) once every half hour, when the flies are troublesome, or for the first two or three days, until the skin is filled with it, and after this its application will be necessary only occasionally. Another receipt, equally as efficacious, is: Six parts sweet oil, 1 part creosote, 1 part pennyroyal.

355. Insect Repellent.—Simmer together over a slow fire 3 ounces pine tar, 2 ounces castor oil, 1 ounce

pennyroyal oil, and bottle for use. Rub it in thoroughly at first, and replenish it on the exposed skin from day to day.—*Nessmuk.*

356. Mosquito Smudge.—Evaporate a piece of gum camphor, one-third the size of an egg, in the tent or room by placing it in a tin vessel and holding it over a candle or other flame, taking care that it does not take fire.

357. Mosquito Smudge.—From the side of a fallen cedar log, dry but not rotten, cut strips of bark about 6 feet long, enough to make a bundle a little larger than two hands can span. From the white inner bark of a growing cedar tree make long, pliable strips, with which bind the dead bark at intervals of 9 inches into a compact mass. Ignite one end of this and leave it to smudge in the tent like a cigar. The smoke is fragrant and agreeable. When the mosquitoes are routed let the smudge remain all night at the tent door and none will enter.

358. Fire for Cooking.—Start it with fine kindling and clean, dry hemlock bark. When you have a bright, even fire from end to end of the space, keep it up with small fagots of the sweetest and most wholesome woods in the forest. These are, in the order named, black birch, hickory, sugar maple, yellow birch and red beech. The sticks should be short and not over 2 inches across. Split wood is better than round. The outdoor range can be made by one man in little more than an hour, and the camper-out who once tries it will never wish to see a “portable camp stove” again.—*Nessmuk.*

359. Camp Cooking Range.—Two logs 6 feet long and 8 inches thick are laid parallel, but 7 inches apart at one end and only 4 at the other. They are bedded firmly and flattened a little on the inside. On the upper sides the logs are carefully hewed and leveled

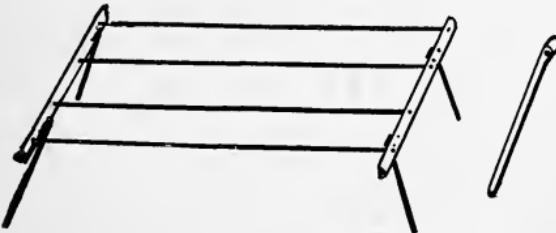
until pots, pans and kettles will sit firmly and evenly on them. A strong forked stake is driven at each end of the space, and a cross-pole, 2 or 3 inches thick, laid on, for hanging kettles. The broad end of the space is for frying-pans and the potato kettle. The narrow end, for coffee-pots and utensils of lesser diameter. From six to eight dishes can be cooked at the same time. Soups, stews, and beans are to be cooked in closely covered kettles hung from the cross-pole, the bottoms of the kettles reaching within some 2 inches of the logs. With a moderate fire they may be left to simmer for hours without care or attention.—*Nessimuk.*

360. Camp Stove.—A camp stove is wholly unnecessary, but some people will use them. One kind is made with an elliptic base of sheet iron 12 inches high and 14 long and 7 inches wide. It has no bottom, the fire being built on the ground and the stove set over it as soon as fairly ignited. In front a 5-inch door allows for feeding and draft. The top has a 6-inch hole to receive kettle or pan, and a funnel 12 inches high and $3\frac{1}{2}$ inches in diameter at the rear conducts off the smoke. An improvement upon this is a large sheet-iron cylinder about 10 to 12 inches in diameter and the same in length, open at both ends. Across one end are stretched several stiff wires upon which rest the cooking utensils. At the other end, which is the bottom when used as a stove, an opening about 6x7 inches from the bottom edge is cut to serve as a door and draft. At the same end, opposite the door, another small opening is cut to give a draft to the other side. When not used as a stove it is reversed, the wires serving as a bottom enables it to hold all the utensils, plates, etc., as a bucket, and a wire handle being fitted to the bottom for that purpose.

361. Oil Stoves.—The best oil stove for use in camp is the small, single-wick handy stove with large, heavy reservoir and handle for lifting. Three of these are pref-

erable to one big, clumsy stove. An oil stove should never be used when wood can be obtained.

362. Folding Cooking Range.—A sort of folding gridiron is used instead of the camp cooking range described above. It is not so serviceable, but quicker to set up. The ends are of half round or flat iron 8 inches long. Each has four holes drilled in it for the cross bars of $\frac{3}{8}$ inch wire, which are riveted in. The legs are $\frac{1}{4}$ -inch



round iron, 6 inches long, the upper ends being flattened down and turned over to fit on wire staples. These staples pass through holes in the end pieces of the gridiron, and are riveted fast. When in use the fire is made and allowed to burn down to a mass of hot coals, then the legs of the gridiron are opened and stuck in the ground over it, making a level framework, on which coffee-pot, pails and pans will rest without danger of upsetting. When not in use, the legs are folded down and the gridiron stowed in a canvas bag.

363. Alcohol Stoves.—The *flamme forcée* alcohol stove is the best. It takes up a little more room than the “pocket” variety, and it does not give more heat; but it burns for a longer time and is not top-heavy when a heavy pot or pan is set on it. Three of these stoves set side by side will answer for cooking in large utensils.

364. Camp Oven.—“Dutch ovens” or bake kettles are used for camp baking where there is a large party. For a small party an oven can be made of two deep tin (sheet-iron is better) basins, one of which has “ears”

riveted to its rim, so that when it is placed bottom up on the other the ears will spring over the rim of the second basin, thus making an oven that is not air-tight, allowing gases to escape.

365. Coffee.—Six heaping tablespoonfuls of browned and ground coffee in a pot, and 3 pints of cold water. Bring it to a boil and then set it aside for 5 minutes. When ready to use drip in half a cup of cold water to settle it.

366. Tea.—Bring water to a boil, then put in the tea, a teaspoonful for every cup and one “for the pot.” Then let it simmer, but not boil for 5 minutes.—*Seneca*.

367. Fried Salt Pork (or Bacon).—Slice thin, put in frying-pan with cold water enough to cover, let it come to a boil and boil two or three minutes; then turn off the water and fry brown on both sides.—*Seneca*.

368. Broiling Small Fish.—Clean them and fasten them by the head to a slender, flexible, birch branch. Stick the other end of the branch into the ground at an angle that will allow the fish to hang just in front of the fire, where it can get the most heat. Put a piece of pork on the head, so that the pork fat will run down and baste the fish. Turn and watch it carefully that it may be cooked evenly. Serve and eat at once. Beefsteak and mutton chops may be cooked the same way. Of course, the blaze must be clear, and the meat must be at a distance to get the most intense heat without any smoke.

369. Fried Fish.—Small fish may be fried whole, but large ones should be cut up. Have enough pork fat or lard bubbling hot in the frying-pan to well cover the fish. Smear the fish well with dry corn meal or flour, or what is better, dip it into a well beaten egg and then into bread or cracker crumbs, and fry both sides to a clear brown. Sprinkle lightly with pepper and salt just as it is turning brown.—*Seneca*.

370. Planked Fish.—Any “flat” fish may be “planked.” Cut off head and tail, split open the back, but do not cut clear through the belly, leaving the fish so that it may be opened wide like a book and tacked on a plank or piece of bark. Tack some thin slices of bacon or pork to the end of the fish that will be uppermost when before the fire. Sharpen one end of the plank and drive it into the ground before a bed of hot coals. Catch the drippings in a tin cup or large spoon and baste the fish continually until it smells so good you can’t wait another instant to eat it. It is then done.—*Seneca*.

371. Clam Chowder.—Fry five or six slices of fat pork crisp, and chop to pieces. Sprinkle in the bottom of pot; lay upon them a stratum of clams, which sprinkle with cayenne or black pepper and salt, and scatter bits of butter over all. Next, have a layer of chopped onions, then one of small crackers split and moistened with warm milk. On them pour a little of the fat left after frying the pork. Next comes a new layer of pork, then one of clams, etc., as before. Proceed until the pot is nearly full, when cover with water and stew slowly—the pot being closely covered—for three-quarters of an hour. Now drain off all the liquor, and then empty the remaining contents into a tureen. Return the gravy to the pot, and thicken with flour or finely rolled crackers; add a glass of claret or sherry, a spoonful of catsup, one of Worcestershire sauce, and boil up, when pour over the chowder.

372. Stewed Game.—Ducks, rabbits, in fact all kinds of game may be stewed. Cut them into small pieces after cleaning, and put into a pot containing enough cold water to a little more than cover them. A minced onion, small pieces of salt pork, vegetables, etc., may be added. Season with salt and pepper, cover the pot and let it simmer until the flesh can be easily pierced with a sharp sliver.—*Seneca*.

373. Roasting Small Game.—Squirrels, birds, etc., may be roasted on a stick before a fire of piping hot coals. Clean the game, impale it on a stick with a piece of fat pork, and set the stick in the ground before the coals. Turn frequently and baste with the drippings, which should be caught in a cup or large spoon. When a sharp sliver will easily go into the breast they are done. Pigeons, squirrels, hares or rabbits, ducks and grouse should be parboiled before roasting.—*Seneca*.

374. Pork and Beans.—Two quarts of beans to 3 pounds of pork. Pick over the beans at night, wash, and soak in cold water until next morning. If only boiled pork and beans are desired, drain the beans and put them with the pork in the pot, just cover with cold water, set over the fire with the cover on the pot and boil slowly till the beans are tender, skimming the scum off as it rises. If baked beans are wanted, parboil the pork and cut it into thin slices, then drain the beans and boil as above. Put half of the beans into the bake kettle, then the pork, then the rest of the beans, and pour over them a half-pint boiling water. Bake until the top is crusted brown.—*Seneca*.

375. Vegetables.—All vegetables must be carefully looked over, the unripe or decayed parts removed, and then they must be washed in cold water. When to be boiled they should be put in boiling salted water, and if the water has to be replenished before the cooking is complete, boiling water should always be used. Keep the vessel covered, and drain the vegetables as soon as done. Do not let the water boil long before the vegetables are put in. Old and strong vegetables sometimes require boiling in two or more waters. Always cut the largest vegetables, so that all will be of nearly the same size and cook evenly.—*Seneca*.

376. Time Table for Cooking Vegetables.—Potatoes, old, boiled 30 min.; potatoes, new, baked 45 min.;

potatoes, new, boiled 20 min.; sweet potatoes boiled, 45 min.; sweet potatoes baked, 1 hr.; squash boiled, 25 min.; squash baked, 45 min.; shell beans boiled, 1 hr.; green peas boiled, 20 to 40 min.; string beans boiled, 1 to 2 hrs.; green corn, 25 min. to 1 hr.; asparagus, 15 to 30 min.; spinach, 1 to 2 hrs.; tomatoes, fresh, 1 hr.; tomatoes, canned, 30 min.; cabbage, 45 min. to 2 hrs.; cauliflower, 1 to 2 hrs.; dandelions, 2 to 3 hrs.; beet greens, 1 hr.; onions, 1 to 2 hrs.; beets, 1 to 5 hrs.; turnips, white, 45 min. to 1 hr.; turnips, yellow, 1½ to 2 hrs.; parsnips, 1 to 2 hrs.; carrots, 1 to 2 hrs. If a piece of lean salt pork is boiled with some of the above, they will be sufficiently seasoned. If not, season with salt, pepper and butter.—*Seneca*.

377. Roast Potatoes.—Scoop out a hole among the ashes at the edge of the fire, fill it with coals and keep it hot for half an hour. Then clean out the coals, put in potatoes and cover them over with hot ashes with a brisk fire on top. In 40 minutes try to stick a sliver into them. If it goes in easy they are done.

378. Cornmeal Mush.—To avoid lumps mix the meal first with enough cold water to make a thin batter and then pour this batter into the pot of boiling water (slightly salted) very gradually, so as not to stop the boiling process. Stir it in and boil (constantly stirring) until it will hang well together when taken out with a spoon. When it is cold it is excellent fried in boiling pork fat or butter.—*Seneca*.

379. Johnnycake.—Make a thick batter by mixing warm (not scalding) water or milk with one pint of cornmeal, and mix in with this a small teaspoonful of salt and a tablespoonful of melted lard. Grease the bake tins, described in hint No. 364, thoroughly with lard or butter, set the batter in one, cover over with the other, and bury the oven among the hot coals, heaping them around it, so as to have an equal heat on all sides. In 30 minutes it should be done.—*Seneca*.

380. Slapjacks.—The frying-pan must be perfectly clean and smooth inside. Scrape it after each panful is cooked and then only occasional greasing will be required, which is best done with a clean rag wrapped around a piece of butter. The batter should be very thin and disturbed as little as possible. When it is cooked firm on one side, turn it. Johnnycake batter thinned down will make slapjacks, or wheat flour batter prepared the same way.

381. Maryland Biscuit.—Take one quart of flour, one tablespoonful of lard, one teaspoonful of salt, enough water—or half water and half milk, if you can get it—to make a stiff dough. Mix thoroughly, and then beat with an axe or club for half an hour, or until the dough becomes light and elastic. Any smooth, thick board, or a smooth stump or log, will answer to beat the dough on. Then mould the dough with the hands or cut with a tin box lid into biscuits $\frac{1}{2}$ -inch thick and 2 inches across. Puncture the top of each biscuit several times with a fork and put them in a Dutch oven and bake with a moderately hot fire, as any other bread should be baked in camp.—*Elkridge*.

382. Fish-eating Ducks.—These ducks may be made palatable by parboiling them in water with an onion in it. After parboiling them discard the onion and lay the ducks in cold water for half an hour, after which they may be roasted, broiled, fried or stewed.—*Seneca*.

383. Frozen Fish.—Soak frozen fish in cold water to thaw them before cooking.

384. Jerked Venison.—Jerked venison is the flesh of the deer cut into thin slices and dried, usually without salt, in the heat of the sun or over a fire.

385. Baking Powder.—Follow the directions on the cans as to quantity.

386. Canned Soups.—Always follow implicitly the directions for cooking printed on the cans.

387. Canned Goods.—Don't cook canned goods in the original can, and thus avoid lead poisoning.

388. Butter in Camp.—Put butter in a fruit jar with water-tight top, and when in camp put the jar in a net, tie a cord to the latter, and sink it to the bottom of a cold spring, river or lake.—*Seneca*.

389. Rusty Knives.—If knives become rusty, rub them with a fresh-cut raw potato dipped in ashes.—*Seneca*.

390. Cleaning Cutlery.—To scour knives and forks stick them into the earth.

391. Washing Dishes.—Pour boiling water into the dirtiest dishes and let it stand awhile. Put the other dishes into the largest pail, pour hot water over them, tone it down with cold water so you can handle them, and wash the dishes, the least dirty first, with a sponge, using soap. Rinse in cold water, drain and dry with a towel. Wring out the sponge in clean water and hang it on a bush ready for use again.—*Seneca*.

392. Rubber Cement.—Pure India rubber 4 ounces, powdered asphaltum $\frac{1}{2}$ ounce. Put in a tin can and add six times the amount of benzine. Let it stand three or four days, then work it with a stick and add benzine, stirring well until it is of the consistency of honey. It should always be covered, except when stirring. To use it scrape the polish from the rubber, then apply the cement to both patch and boat or garment. Dry one-half hour, then apply another coat and press on the patch. Keep it away from the fire, it is explosive.

393. Rubber Cement.—One-half pound bisulph. of carbon, three handfuls of gutta percha; put in a wide-mouthed bottle; shake frequently; at the end of two

weeks strain through a cloth, return to bottle and cork tightly, for reasons that will be obvious. To apply, first dry the article, then smear the cement on and allow it to evaporate before bringing edges together. After it has become light-colored in spots, warm and bring edges perfectly together; stand away for a while and the job is complete.—*Joseph C. Grubb.*

394. Mildewed Tents.—To remove mildew whitewash the tent with a weak solution of chloride of lime. Add salt to make it stick. A strong solution will rot the cloth. Two pounds of slackened lime to a barrel of soft water is the right proportion.

395. Waterproofing Tents.—Dissolve $\frac{1}{2}$ pound each of sugar of lead and powdered alum in a bucket of rain water, and pour the solution into a large tub. Soak your tent for twenty-four hours, and then hang it up to dry instead of wringing it dry. Rain will hang to it in globules, but won't go through the cloth. It will also prevent mildew.

396. Waterproofing Linen.—Take a solution of sulphate of alumina in ten times its weight of water, and a soap bath of the following composition: One part of light colored resin and one part of crystallized soda (sal soda) and boiled in ten parts of water until dissolved. The resin soap is precipitated with half part of table salt, and is subsequently dissolved along with one part of white curd soap in thirty parts of hot water. It should be put in wooden tubs for use. On made up articles the two solutions can be applied with a brush and then rinsed off.

397. Waterproof for Leather.—Melt together 1 pound tallow, $\frac{1}{2}$ ounce neat'sfoot oil, 1 ounce resin, $\frac{1}{2}$ ounce lampblack and 1 tablespoonful linseed oil.

398. Waterproof for Boots.—Melt together 6 ounces mutton suet, 6 ounces beeswax and 4 ounces resin, and add 1 pint linseed oil.

399. Waterproof for Cordage Fabrics.—Take of pulverized potash alum and crushed acetate of lead, each 20 parts, bicarbonate of potassium and Glauber's salt, each 12 parts, and pour over this mixture 3,000 parts of soft water, all by weight. Also dissolve separately in an equal quantity of water 9 parts of oleine soap, and then mix both solutions. The articles are left in this solution until thoroughly saturated, allowed to drain, dried, brushed, and finally pressed. For linen, leather and wood add margarine, 6 parts, and for cotton or paper some gelatine, 3 parts, and resin, 6 parts. Impregnation with this preparation, it is claimed, does not injure the colors. Alum and sugar of lead alone, or alum and caoutchouc, can be used for the same purpose.

400. Waterproof Bags.—Make them of unbleached muslin, sewn in a lap seam, with a double row of stitches. When sewn they are dipped in water and slightly shaken to remove the drops, and then, while wet, a mixture of equal parts of boiled oil, raw oil and turpentine is applied to the outside with a brush. This takes a week to become thoroughly dry, and then another coat is put on without dampening the cloth, and if a little liquid drier is added to the mixture this coat will dry in four or five days. They can be made in all sizes, being closed at the mouth with a draw-string, and are excellent receptacles for various articles of food, sugar, coffee, bread, etc., and for clothing and blankets.—*Tonic.*

401. Handy Tool.—Have a pair of blacksmith's pliers 12 to 18 inches long. It is a good poker for the fire, a gripper for the handleless frying-pan and hot dishes of all kinds, can be used as a hammer, a wrench, and for many other purposes.

402. Compass in the Woods.—Never go into the woods without a compass. The story books say moss is only found on the north side of trees, and that where

moss doesn't grow the north side of a tree trunk is light and the south side dark. These indications are not to be trusted.

403. Fire Lighting with a Gun.—Take a bit of rag, the cloth lining from a hat, coat, etc. Rub powder into it well, then load it into your gun or cartridge shell. Fire it among dry leaves, and have some small dry shivers of wood ready to catch the blaze before it ceases to glow.

404. Stiff Boots.—To prevent wet boots from becoming stiff, rub them with a good dressing of castor oil just before they are thoroughly dry. To soften stiff boots, soak them in water and treat as above.

405. Wet Boots.—Never put wet boots near a fire to dry; they should be dried slowly.

406. Footgear for the Woods.—Let the boots be single soled, single backs and single fronts, except light, short foot-linings. Backs of solid "country kip;" fronts of substantial French calf; heel 1 inch high, with steel nails; countered outside; straps narrow, of fine French calf put on "astraddle," and set down to the top of the back. The out sole stout Spanish oak, and pegged rather than sewed, although either is good.—*Nessimuk*.

407. Wading Shoes.—Shoes for wading are made with thick soles studded with round-headed nails, and contain small holes to let the water escape, but not so large as to permit mud and pebbles to enter.

408. Cold Tea.—A bottle of cold tea is much better than a bottle of whisky for use in the field.

CHAPTER V.

DOGS.

409. In the Field.—Do not feed too much before starting out for a hunt. Look after your dog's feet after a day's hunt. Leave no burrs on over night. Feed at night after hunting. Don't allow them to fill themselves with water while hunting.

410. Care of Pups.—Give the mother plenty of healthful food and exercise, and as soon as the puppies are a few days old remove them from their stall and make their bed upon the bare ground until they are weaned. Never wash a puppy. It is of no benefit to them, except in looks, and it is often a source of trouble in that it induces a cold which may bring disease and death. Keep them sheltered from cold and inclement weather, but at all times give them plenty of room on the ground, where they can dig in the dirt and get fresh earth to eat when they wish it. After weaning, accustom them to a diet of Indian or oatmeal, well cooked and mixed with plenty of thick sour milk. This is the best possible thing to expel the worms that many times infest them. It is also the best regulator of the bowels, as by a little care in increasing or diminishing the quantity it will always keep them just right. Frequently boil meat and use the broth for making their mush, and if their condition is not just to suit, give them an occasional meal of well-cooked meat,

and when their teeth begin to trouble them give them plenty of large bones, with a little meat on them, and never, under any circumstances—for their ordinary ailments—give them a single dose of medicine, and above all else, never worry with thoughts or fears that they will not live.—*S. T. Hammond.*

411. Feeding Pups.—Pups should be fed three or four times daily up to six or eight weeks old, and then but three times. Feed soft light food until second teeth are well up, such as mashed potatoes in bread and milk, or scraps from the table made soft with milk or gravies that are not greasy. All grease, except butter, should be avoided, and all vegetables must be finely mashed so that dogs can digest them. Old dogs can easily digest bones, but not hard pieces of vegetables. Bones should be kept from pups, except large ones to gnaw and work at while cutting teeth. Feed pup at each time in bulk not over two-thirds the size of its head or you will overload its stomach and it will not do well. You will find a meal once or twice a week of good rich buttermilk will be an acceptable dish for growing dogs, as it keeps their blood pure, bowels loose, and makes their skin clean and hair glossy.

412. Teaching Pups to Take to Water.—If pups show a disinclination to take to water don't force them in. The best plan is to take them to a stream which you can wade through; walk through to the other side, and they will probably follow you at once; if they do not, walk straight away from the opposite side and go out of sight; they will come after making a little fuss about it. If you have not a suitable shallow stream, but are obliged to make use of a deep river for your purpose, get an attendant whom they do not know to hold your puppies while you go around by a bridge out of their sight, and come down opposite to them, and follow the instructions I have given above; but remember, many young dogs

have at first a great fear of getting out of their depth all at once, but will freely dabble into a shallow stream; so it is best to lead them on by degrees. Once having got off their legs, and finding that it is an easy matter to swim, there will be no further trouble. Always choose warm weather for this teaching.

413. Worms in Puppies.—Areca nut, santonine, turpentine, tin filings and other usual remedies will rid the dog of worms, but tend to inflame the urinary organs and often leave the dog in a bad state. A better remedy is a teaspoonful of powdered charcoal given twice a day for three or four days. Charcoal is a purifier and absorbent of putrid gases; it absorbs gases very rapidly. One cubic inch of fresh charcoal will absorb nearly 100 inches of gaseous ammonia. When given to a dog it absorbs or destroys the putrescent gases which are generated in the stomach and alimentary canal. These gases help to generate the worms, and without them the worm cannot live. Charcoal also acts on the digestive organs, increasing their power as well as healing any unhealthy condition of the stomach if existing there.

414. Care of Cockers.—Cockers get their full height at from seven to nine months old, and then begin to fill out in body, the head acquiring its permanent shape last. The long feathering on the ears, like a man's beard, does not reach perfection until maturity, say eighteen months old, and if the ears become frozen before this age the growth of "feather" will be stunted. Give the pup clean and wholesome food, lots of exercise in the open air, and a sweet bed of clean pine shavings. These points are necessary to obtain a handsome, healthy and clean dog.

415. Training Cockers.—1. Teach the usual whistle and command for *come*. 2. To know their name. 3. The beckon to come. Use it together with the whistle

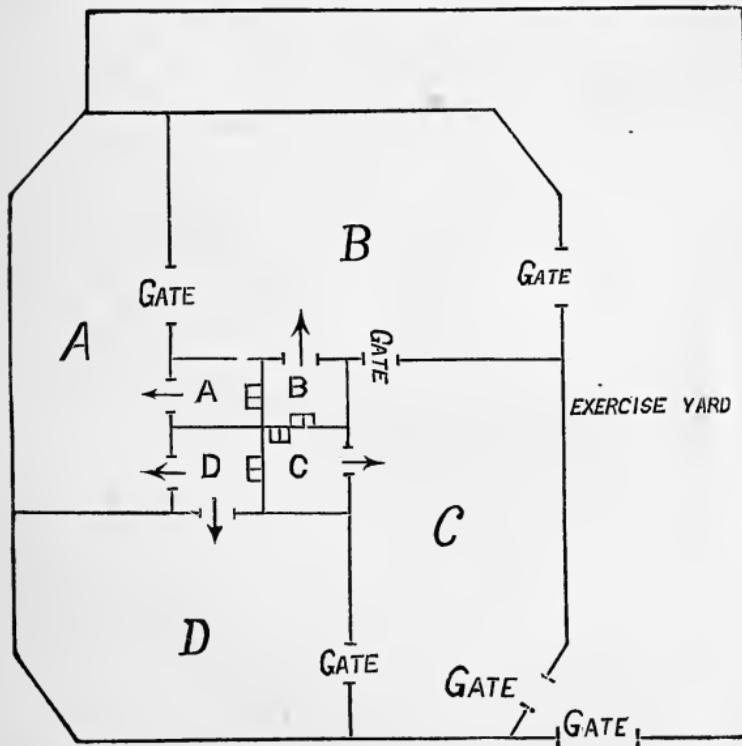
for come until he comes to it. 4. The short and shrill whistle for attention. 5. Find, by motion. Drop pieces of food, gradually increasing the distance and always use the words, "Find it." 6. *Down!* or *charge!* 7. *Steady!* and *whoa!* With string about his neck walk yourself as fast as he leads you. Cry "Steady!" and steady yourself, which steadies him. Cry "Whoa!" and halt, which stops him. 8. *On!* or *hie on!* From the halt, motion him on accompanied with the words "On!" or "Hie on!" 9. *Heel!* With string on neck and switch in hand, keep him back at heel with the switch, using the word "Heel!" at the same time. 10. *Take care!* Used for making him desist while doing any wrong act. 11. *Fine fellow!* and *shame!* Used as words of encouragement and discouragement. 12. *Fetch!* Using a ball or glove. 13. *Find!* After he fetches articles hide them near by for him to find, and motion in the direction it may be. 14. *To Ride in Wagon.* Box his ears and scold for jumping out, standing up or uneasiness. 15. *Get Used to Water.* Be very careful at first not to frighten him. 16. *Learn the Report of a Gun.* First put a string on pup and fasten it to yourself. Commence by firing caps, then light charges at a bird thrown into the air. 17. *To Tree Ruffed Grouse.* To teach your pup to be an expert treerer of ruffed grouse, take him out late in the afternoon (at the opening of the grouse season if possible), into thick underbrush where you know the grouse are. Let him flush them up into the trees, and it being thick underbrush or second growth, they will light close to him and attract his attention, when he will bark at them (or will very soon). Carefully shoot one or two over him and go home. Repeat this lesson quite a few times and he gets the impression they must be in a tree before being shot. After this is instilled into him, shooting them or cock on the wing will not unsteady him.

416. Gunshyness.—Use very light charges of powder. If dog flinches from these begin by snapping caps,

then use lightest powder charges, increasing the charge as he becomes accustomed to it.

417. Chicken-Killing Habit.—Slap the dog with the chicken he has killed a few times and make him understand he has done wrong. Then pass the chicken's legs each side of the dog's neck and tie the feet together so that the chicken hangs under his chin. Leave it on him all day.

418. Kennel and Yard.—For ten to fourteen dogs the accompanying cut shows a well arranged kennel. The ground should be covered with gravel, and earthen



vessels used to feed and water in. The yards *A*, *B*, *C*, and *D*, are about 2×4 rods each; the rooms each 6×8

feet, which are neatly roofed and well ventilated. The fence is of pickets $2\frac{1}{2}$ inches wide and 7 feet high, $2\frac{1}{2}$ inches space.

419. Fumigating Kennels.—Place some sulphur in an iron vessel and pour a little alcohol on it. Set fire to the alcohol, which will ignite the sulphur. Take out your dogs and put the vessel into the kennel.

420. Feet.—For sore feet: Wash in lukewarm water, adding a little salt. Anoint with tar ointment. To prevent sore feet: Bathe twice daily for a few days in a solution of 1 quart whisky, 1 ounce tannin, and piece of alum size of a walnut. Old beef brine is also good.

421. Removing Dew Claws.—Always remove them when the pup is very young, their excision then being accomplished with a sharp pair of scissors. First divide the skin and draw the dew claw to one side before it is detached, in order that the skin may afterward cover the wound.

422. Sick Nursing.—Kennel a sick dog alone, in a warm, dry, well ventilated kennel, with a box or basket lined with straw to lie in. Change straw daily. Put a basin of cold water, changed twice daily, in reach. Remove evacuations daily and sprinkle a disinfectant about. Keep the dog quiet and don't exercise, groom or wash him. Give medicines regularly at stated times, and never a double dose when a single dose has been omitted previously. A harsh word to a sick dog may bring on fits. See Administering Medicines, Hint 425.

423. Emetic.—Hold up the head, open the mouth and drop a small handful of salt down his throat as far possible. Then hold his mouth shut until he swallows the salt.

424. Giving Pills to Dogs.—Coat the pills by rolling in wheat flour. Dip the finger into cod liver oil and

let the dog lick it off; then roll the pills in the oil and drop them into his mouth when he opens it to receive the finger. The most disagreeable pills will slip down his throat at once.

425. Administering Medicines.—To have their proper and desired effects, medicines should be given regularly and at stated times, and not, as some persons do, to give a double one because they forgot one. I have known this to be done repeatedly, and wish to warn owners of its fatal consequences. The medicine should be given quietly and without disturbing the dog, if possible. One person, as a rule, is sufficient to give it, if a little tact is manifested. If it be liquid medicine it is best given out of a small vial, one which will hold about an ounce. In administering medicine the person should stand in front of the dog, and with the left hand the muzzle of the animal should be held, the head slightly elevated, and the teeth kept nearly closed. The bottle containing the potion should be held in the right hand, and the neck of it placed within the lips on the left side of the face, between the teeth and cheek. Then small quantities should be poured into the mouth, and on no account should a second quantity be given until the first has been swallowed. Some dogs are rather obstinate in taking medicine, and hold it in the mouth some seconds before swallowing. Under these circumstances many people pinch the throat, with the idea of inducing the dog to swallow. This act is dangerous, as it often makes the patient cough, and, with the fluid in the throat, sometimes choke from drawing it into the windpipe. All that is necessary, in most cases, is a little patience to keep the dog's head elevated, and he will soon swallow. In very obstinate cases the end of the nose may be pinched, which soon compels the dog to perform the act of deglutition. To give a pill or bolus the upper part of the muzzle should be grasped and the lips pressed between the teeth. This forces the mouth

open and it remains so, because the dog is afraid of biting himself. The head should then be elevated, and the pill or bolus dropped into the back of the mouth. The mouth must then be immediately closed and held until the dog has swallowed.—*Dr. A. J. Sewell, in Live Stock Journal.*

426. Poisoned Dogs.—As soon as you know a dog has been poisoned, inject about one ounce of hydrate of chloral into his back with a hypodermic syringe, the quantity to be governed by the size of the dog and severity of his symptoms. As long as there is life in him do not despair. I have known dogs to be saved by this treatment when in the death throes.—*Dick.*

427. Mange.—This disease is caused by dirty kennels, neglect, want of nourishing or improper food. Give the dog 1 ounce of salts and rub into the skin every three days the following mixture: 1 quart train oil or tanners' oil, 1 large wineglass spirits turpentine, enough sulphur to make the mixture of the consistency of molasses. Scrub it well into the skin, and let it remain on a fortnight, after which wash with soap and water.

428. Distemper.—When a pup's permanent tusks are about half through, the temporary ones being still retained, look out for distemper. It is most common in fall or spring. Moisture of the eyes and a short cough are the earliest signs. The dog seeks warmth, constantly shivers, and if touched trembles violently. The discharge from the eyes becomes thick and purulent. A mucus or yellow fluid moistens the nostrils. If the dog is not attended to the disease may seem to disappear in a few days, but it generally soon reappears. Remedies vary according to circumstances, and no attempt to prescribe for the disease is proper here.

429. Lice.—Comb the dog thoroughly with a fine comb, and get off most of them; then wash him with soap

and water, and before he is dry rub him all over with a strong solution of common salt and water, to which a little saltpeter has been added, allowing the solution to dry on. It may be necessary to repeat this three or four times at intervals of about three days.—*Bub.*

430. Sawdust in Kennels.—Never use sawdust in kennels. It becomes attached to the dog's food and is injurious to the dog if swallowed.

431. Breeding.—Do not breed from a bitch under 18 months old. Let her mate excel in points in which she is deficient. Don't breed brother and sister or parent and pup. Hunt the bitch occasionally while in pup, and feed well but not too much. Don't weaken the bitch by making her raise too many pups. Six or seven is a plenty. Give her a warm kennel and let her run loose, free to go or come. Pups may be weaned when 6 or 8 weeks old.

432. Separating Fighting Dogs.—Choking off, douching with water, etc., will sometimes answer, but very game dogs will hang on, even under a pump, and choking off is sometimes somewhat dangerous. A certain means is showering something over the dogs that will produce sneezing. Be his will ever so good, the motion of sneezing involuntarily opens his jaws. Pepper answers very well, but snuff is probably the best, as it can be used *ad libitum*, and will certainly produce the effect if enough is used.

433. Field Trial Rules.—Pointing.—The judges will allow only those dogs the maximum that point all the birds possible for them to point under existing circumstances. A dog to earn the maximum number of points under this head must display a first-class nose and exhibit great judgment in finding and pointing his birds, and make no flushes that a dog with above qualities would avoid in ordinary hunting. The dogs are to be hunted in all respects as in an ordinary day's shooting. Inex-

cusable or willful flushes will detract from a dog's score under this head, but the character of this flush must be always taken into account in estimating the penalty, if any. The judges must not ask the handlers if their dogs are pointing, but must decide for themselves. They shall always consider the nature of the ground, the wind and the birds, and not penalize a dog for flushing a bird it would be impossible to point. The penalty for flushes to be graded by the character of the offense. The judges shall not require the handlers to work their dogs down wind. Judges are allowed the discretion of declaring dogs out of the heat if absent when called.

434. Pace.—The dog that maintains the fastest gait throughout the trial, except when in cover or on game, to receive the full number of points, all others to be graded by him.

435. Backing.—A dog to get maximum for backing must stop at the sight of another dog pointing, without being cautioned by his handler. A dog shall not be said to refuse to back, unless the dog pointing stands upon his feet and is motionless. Should a dog be spoken to or cautioned while backing, the judges shall grade his score accordingly. Judges shall have power to give dogs more than one opportunity to back.

436. Style.—The judges shall consider the dog's grace in ranging and drawing, and attitudes in pointing and backing.

437. Stauntness.—The maximum allowed such dogs only as do not advance from their point when they are on game, until ordered on.

438. Ranging.—The maximum only allowed the dogs that maintain the most killing range throughout, viz., wide or close, as the necessity of the case may require.

439. Quartering.—The maximum only allowed such dogs as work at right angles with the handler, unless the ground renders such work impracticable.

440. Obedience and Disposition.—The maximum only allowed to a dog that works promptly to the gun, without noise or severity, and is obedient, prompt, cheerful and easily handled. A dog to receive credit for pace, ranging, quartering, obedience and disposition, must earn something under the head of pointing.

441. Retrieving.—To receive the maximum under this head a dog shall go promptly and cheerfully for the bird, and deliver it to the handler without mouthing or mutilation.

442. False Pointing.—The judges shall give a dog ample opportunity to discover whether or not he is on a true point, and the penalty shall range from 1 to 5 for his acts throughout the heat.

443. Breaking In—Is when a dog, through imperfect breaking or from excitement, leaves his position when the birds rise, whether the gun is fired or not, and starts to break shot or chase, but stops within a few feet of the point from which he started, of his own accord or by command.

444. Breaking Shot—Is when a dog runs in when a shot is fired with the intention of getting the bird and does not stop promptly at command.

445. Chasing—Is when a dog follows the birds, either when the gun is fired or not, to an extent to be beyond the control of the handler for the time being.

CHAPTER VI.

BOATING AND YACHTING.

446. Cleaning Boats.—To clean a varnished boat, rub it with alcohol, using a sponge, or with the decoction formed by steeping tea leaves half an hour in a tin pan. Strain through a sieve. To clean white paint, take up a piece of whiting on a damp piece of old white flannel, and rub over the surface lightly. Black paint may be refreshed by passing over it lightly with an oiled rag almost dry.

447. Varnishing Bright Boats.—The first point is to clean the boat, thoroughly scrubbing with hot water and soap, until all dirt is removed, then washing with clean water. After all repairs have been made, the old varnish should be sandpapered or rubbed down until it is perfectly smooth, unless the former coats were too thick, in which case the boat must be scraped with glass or a steel scraper. After sandpapering, the new portions, if there are any, should have a coat or two of shellac. For varnishing, a spot free from all dust should be selected in a dry place and out of the wind. The best varnish for boats and outside work is spar composition, of which there are several makes. Crockett's and Pratt & Lambert's are both good. The varnish should be laid on in a thin coat, and allowed to harden thoroughly before applying a second, if one is needed. It is better to put but one coat on an old boat, renewing it when necessary, rather

than putting on several thick coats at one time. For new work there are several preparations in the market known as wood fibres, preservatives, etc., intended to fill the grain of the wood before applying the spar composition, thus requiring less of the latter, and giving a better surface. A new varnished surface should never be exposed to a hot sun, or it will blister badly.

448. Removing Paint or Putty.—Take 3 pounds quick lime and 1 pound pearl ash and slake in water, heating until the mixture is about the consistency of paint. Apply with a brush and let stand about twelve hours, when paint or putty may be removed by scraping gently.

449. Pot-Leading Boats' Bottoms.—Apply a thin coat of linseed oil, dust on the black lead powder and rub down smooth.

450. Bleaching Sails.—One barrel salt water, 3 pounds chloride of lime, 2 pounds whiting, 3 pounds soda ash, 3 pounds salt. Scrub sails lightly with a broom on both sides and dry on the beach.

451. Boats in Winter.—Always preserve your boat from the weather, especially on the sunny side. Tack or lash old canvas, burlap or matting around. Keep her clear of the mud and wash of the tide, or keel will rot away. Sweep snow off her decks. Air below during fine days. Stop all leaks that may develop about the bits, partners, bolts, etc., as the wood dries. Haul out clear of sheds and shanties, and insure for fire. Comb up all lanyards. Stow sails and gear where they will not mildew and out of the way of rats, mice and thieves.

452. Spars in Winter.—Slush down with mixture of white lead and tallow and put under cover.

453. Ropes and Rigging.—A rope is composed of threads of hemp and other fibrous material. These

threads are called *yarns*. A number of yarns twisted together form a *strand*; three or more strands twisted together form a rope. A rope's *bight* is any part not an end. A boat's *rigging* is made from ropes. *Standing rigging* is that which is stationary, like shrouds, stays, etc.; *running rigging* refers to ropes that run through blocks, like halliards and sheets.

454. Sailors' Knots—Two Half Hitches.—Pass



the end of the rope around the standing part and bring it up through the bight (one half hitch). Take it around again for two half hitches.

455. Bowline Knot.—See Chap. III., Hint No. 323.

456. Square or Reef Knot.—Take an overhand knot around a spar; take an end in each hand and cross them on the same side on which they came up; pass one end round the other and bring it up through the bight. If the ends are crossed the wrong way it will be a "granny" knot, and will not hold.



457. Timber Hitch.—Take a turn of the rope



around a spar, lead the end under and over the standing part, and pass two or more round turns around its own part; pass the first turn *over* the end part instead of through the bight, as in a half hitch.

458. Sheet Bend.—Pass the end of a rope up through the turn of another, round both parts of the other and under its own part. This does not jam, and is the best knot that we know of for tying together two ropes of different sizes, or a chair to a rope.



459. Anchor Knot.—Take two turns around the

ring with the end of the rope; hitch the end around the standing part and through both turns, and then pass the end over the second and under the first turn.

460. Sheep Shank.—Make two long bights in a rope which shall overlay one another; take a half hitch over each end of the overlaying part with the standing part which is next to it. Used to shorten a rope, the main-sheet, for instance, temporarily, the whole being cast off to full length instantly by a sharp pull on any of the bights where they overlay.

461. Care of Ballast.—To keep ballast clean remove every season, scrub and whitewash with hot lime or coat with red lead. Clean and red lead the hold, or use mixture of two-thirds Stockholm tar and one-third coal tar boiled together. Never stow ballast on the raw wood.

462. Starboard and Port.—*Starboard* refers to anything appertaining to the right-hand side of a boat, the observer looking toward the bow. *Port* refers to the left-hand side. When the boat is under way and a wind is blowing these terms are generally replaced by *windward* (the direction from which the wind comes) and *leeward* (the direction to which the wind goes).

463. Parts of a Sail.—Of fore-and-aft sails, such as are used on all small sailboats and yachts, the *head* of the sail is that part fastened to the gaff; the *foot* is fastened to the boom; the *leach* extends from the end of the gaff to the end of the boom furthest removed from the mast; the *luff* extends from gaff end to boom end nearest the mast, to which it is generally fastened by hoops; the *clews* are what a landsman would call the “corners” of the sail, and the clew at the luff and foot of the sail is sometimes called the *tack*. The jib has but three clews,

464. Heaving the Hand Lead.—Grasp the lead line about a fathom from the lead, swing it to and fro and then launch it out so that it strikes the water in advance of the yacht's course. When the yacht is over the spot where the lead has been cast find the depth of water by holding the line perpendicular for an instant. The best position for casting is on deck forward of the shrouds, on the windward side. The ten fathom lead line is marked thus: At 1 fathom, a knot; 2, two knots; 3, three knots; 4, four knots; 5, white rag; 6, six knots; 7, red rag; 8, blue rag; 9, nothing; 10, piece of leather.

465. "Eight Bells," etc.—The day at sea begins at 12 o'clock noon, when eight bells are struck, by sets of twos, *one, two* rapidly following each other, then a pause of 3 seconds, then *one, two* again, and so on. Three bells would be struck, *one, two—one*; four bells, *one, two—one, two*. At 12:30 P. M. one bell is struck; at 1 P. M. two bells, and one bell more every half hour until 4 P. M., when it is eight bells again. It is then repeated, the next eight bells coming at 8 P. M., the next at midnight and so on.

466. Watches.—The afternoon watch is from eight bells (noon) to eight bells (4 P. M.); then follows the first dog watch until four bells (6 P. M.); the second dog watch until eight bells (8 P. M.); the first night watch until eight bells (midnight); the second night watch until eight bells (4 A. M.); the morning watch until eight bells (8 A. M.), and the forenoon watch until eight bells (noon).

467. Boxing the Compass.—Learning to repeat the thirty-two points on the mariner's compass by memory from right to left and back again, commencing at north, and keeping at the same time in the eye the position of the points upon the compass card, is a necessity for all sailors who use a chart or attempt the least important problems in sailing. The points, abbreviated,

are as follows: N.; N. by E.; N.N.E.; N.E. by N.; N.E.; N.E. by E.; E.N.E.; E. by N.; E.; E. by S.; E.S.E.; S.E. by E.; S.E.; S.E. by S.; S.S.E.; S. by E.; S.; S. by W.; S.S.W.; S.W. by S.; S.W.; S.W. by W.; W.S.W.; W. by S.; W.; W. by N.; W.N.W.; N.W. by W.; N. W.; N.W. by N.; N.N.W.; N. by W.

468. "Five Knot Breeze," etc.—The wind is said to be a five knot or a seven knot breeze when a full rigged ship would be driven at about those rates. It is ascertained merely by experience, and is an expression in use among sailors. A one to two knot breeze is a light air with a velocity of 1 to $3\frac{1}{2}$ miles; a two to three knot breeze has a velocity of $3\frac{1}{2}$ to 6 miles; a three to five knot wind has a velocity of 6 to 8 miles; five to six knots, 8 to 10 miles; six to seven knots, 10 to 16 miles; seven to eight knots, 16 to 24 miles; eight to ten knots, 24 to 35 miles.

469. Velocity of Wind.—A "fresh breeze" blows 16 miles an hour; a "single reef" breeze blows 18 miles an hour; a "close reef" breeze blows 20 miles an hour; a "gale" blows 24 miles an hour; a "fresh gale" blows 30 miles an hour.

470. Grounding.—If the yacht grounds upon a shoal and is left by the tide, get out an anchor at once to windward. Then, when the flood begins the yacht will not be blown further on the shoal but will soon ride head to wind or tide.

471. Buoys.—In entering a harbor leave black buoys to port, red buoys to starboard.

472. Springing a Leak.—When a yacht springs a leak pass a sail over the bows and lead it aft over the leak by means of ropes on both sides of the yacht. Then make for the nearest port at once for repairs.

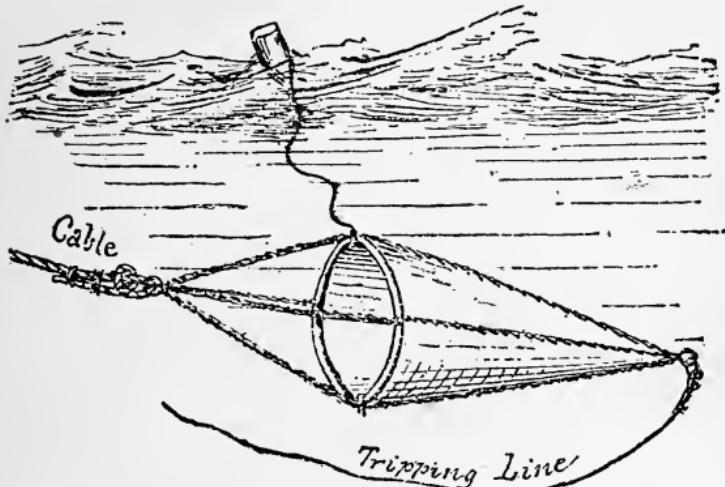
473. Cement for Stopping Leaks.—The rubber cement used for fastening bicycle tires is excellent for

stopping leaks in canoes, either joint, cracks or holes; quite large holes can be fixed up with it for cracks or joints, with a hot iron or small stone. Melt and rub the cement well in, leave a small streak of the cement over the crack or joint. For mending a hole take a piece of canvas or boot leg large enough to cover the hole, with about one inch lap all around. With a hot iron or stone smear over the patch with a good coat of rubber cement, also smear around the edges of the hole, then heat the patch quite hot and press it in place. Then smear over the whole with cement, using the hot iron or stone. The cement will harden in a short time, when it will require no further looking after. This is for emergencies. To fix a hole permanently it should be cut out square or oblong, with slightly beveling edges; then neatly fit a piece of wood to the hole, smear the edges of the piece as well as the edges of the hole with rubber cement; have it quite warm, then press the piece in place; if well done it will neither come out nor leak.—*Californian*.

474. Sailing Rules.—The “rules of the road” on the water are important to know. A vessel is on the starboard tack when the wind blows against her starboard side, and she has the right of way over a vessel on the port tack except when the latter is sailing close-hauled and the former sailing free, in which case the vessel on the port tack has the right of way. If two vessels have the wind blowing on the same side, the vessel to windward shall keep out of the way of the one to leeward. If two sailing vessels are meeting end on the helms of both shall be put to port, each steering to starboard. A steam vessel must get out of the way of a sailing vessel. Every vessel overtaking another must keep out of the latter’s way.

475. McManus’s Sea Anchor.—The drag consists of a conical canvas bag with a circular mouth. It is attached to an iron ring with hinges in the center. To this

ring the bridle is secured, the spans terminating in a large eye or thimble to which the hawser or riding cable is bent. To strengthen the bag "roping" is sewn, as shown in the sketch, and an eye seized off at the tail end for



THE DRAG IN USE.



READY FOR STOWING

making fast the tripping line. When not in use the iron ring is doubled up, the canvas furled snugly by passing the buoy line around the whole. In this shape it occupies but little space and can be got ready at a moment's notice. If you are anxious to lie head to wind, or wish to avoid drifting, the ring is opened, cable and trip bent on and hove over the bows. The bag fills as soon as a strain is brought on the cable and is prevented from sinking by the cork buoy with just line enough to let the drag settle into solid water. To haul aboard, check the cable, jerk on the trip and haul in tail first, when the rig will come home without trouble.

476. Lights on Boats.—All steam vessels must carry at night, when under way, a white light at the foremast head, a green light on the starboard side and a red light on the port side; when towing other vessels a steam vessel must carry two white masthead lights vertically in addition to side lights. Sailing vessels under way must carry the same side lights as a steam vessel, but no white masthead light. All vessels at anchor must show a white light not more than 20ft. above the hull. Small or open boats must carry a lantern having a green slide on one side and a red slide on the other, and on the approach of other vessels must show the proper color on the side toward which the approaching vessel is coming.

477. Boarding a Yacht.—In coming alongside a yacht at anchor all persons who are not guests of the captain or specially invited, or of some rank, should come to the port gangway. Ladies always come aboard on the starboard side.

478. Canvas Canoe.—The ribs and long strips are made of oak $\frac{1}{4}$ by scant $\frac{1}{4}$ inch; the ribs are placed 5 inches apart, and there are six long strips on each side, and two more 8 feet long to fill up the larger space in the middle. Where each strip and rib cross they are clinched together with a copper nail. The gunwale strips are $\frac{7}{8}$ square and each rib is let into them and nailed with two copper nails. Use just 4 yards of 52-inch canvas, and the pieces taken off each end make the deck. Bring the canvas over the dado in the stem and stern, and put in a spline; then put on a keel made of oak outside of the canvas and screw it to the center keelson. The cockpit is made of $\frac{1}{2}$ -inch black walnut screwed to the gunwale strips, and has a piece $\frac{1}{2}$ by 1 inch screwed on top on the sides and back, so that it leaves $\frac{1}{2}$ inch projection. In front use a piece $\frac{1}{2}$ inch by 3 inches. The seat is made of two $\frac{7}{8}$ -inch pine pieces, 3 inches wide, screwed to the ribs, and the top is rabbeted $\frac{1}{2}$ by $\frac{1}{2}$, and the top is made of

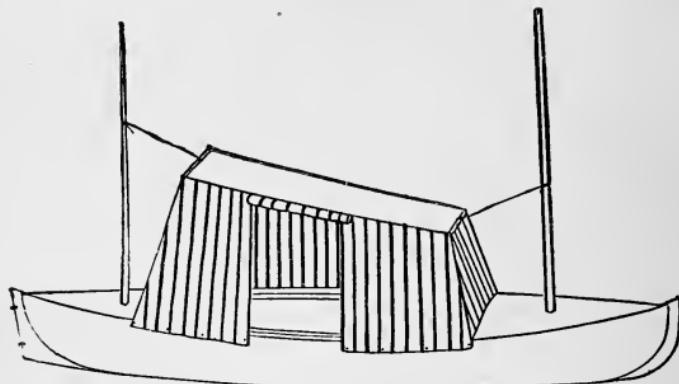
2-inch by $\frac{1}{2}$ -inch pine strips placed 1 inch apart and cleated together. The deck is raised 1 inch in center of boat, so that it sheds the water, both sidewise and endwise. Bring the canvas around the boat and nail it on top of gunwale, and the deck the same, and then put a neat $\frac{1}{2}$ -inch half-round molding on top of the tacks, so that it makes a neat job.—*Far West.*

479. Paint for Canvas Canoes.—One gallon boiled linseed oil, 2 pounds of beeswax, 1 quart of benzine. Cut the wax in the benzine, add to the oil; heat quite warm, and apply as long as the canvas will take it. It adds very little to the weight of the canoe, and one coat will last a long time. No. 10 duck is better than heavier canvas; the mixture will keep it very soft and pliable, and will stand some pretty hard knocks.—*S. D. Kendall.*

480. Waterproofing Canvas Boats.—Boil 6 ounces hard yellow soap in $\frac{1}{2}$ pint of water. Add $\frac{1}{2}$ pound patent dryer and 5 pounds boiled linseed oil, and apply with a brush.

481. Building a Boat in Three Hours.—Take some good hogshead hoops; select the best one; and then taking two strips of boards fasten them to the keel hoop, which has been opened out to form a backbone, bow and stern, to keep it upright. Get about thirty good barrel hoops and tie them all along with stout tarred twine to the keel hoop, and two more hogshead hoops, which are tied one end of each to an end of the keel hoop, and then bring the other ends round, tie them to the other end of the keel—this makes the side or rail. The ends or tops of the barrel hoops are next tied to these rail hoops. This produces a skeleton complete. Paste old newspapers together and lay them on the skcleton to get a good pattern, and cut some heavy twilled bed-ticking to fit and have it sewed together. This cover is put on and over the frame, painted and dried in the sun.—*G. F. W.*

482. Mohican Boat Tent.—The Mohican canoe or boat tent is made as follows: The top piece is of canvas, 22 inches wide and 6 to 7 feet long. At each end a hem is turned in, to take a round stick, three-fourths of an inch in diameter and 22 inches long. The sides and ends of the tent are made of striped awning stuff, which comes 29 inches wide, so that three breadths may



Mohican Tent

be used. The tent is 30 inches wide at bottom, and about 1 foot longer on bottom than on top. The sides and ends are sewed together at the corners, but the middle breadth on each side is sewed only to the top, making a curtain which may be rolled up, as shown. These curtains lap over the adjoining sides a little, and are provided with tapes to tie them fast. The bottom of the tent is fitted with grommets, which hook over small screw heads under the beading of the deck. The tent is supported by two ropes fastened to the mast.

CHAPTER VII.

HEALTH HINTS AND REMEDIES.

483. Get a Doctor.—The Hints in this chapter are designed to indicate such treatment as can be applied to relieve a sufferer when in the field or camp *until the doctor comes*. Where there is any serious injury or illness, get a doctor soon as possible.

484. Empty Stomach.—Never start out hunting or tramping on an empty stomach. Eat something first, or at least drink a cup of coffee.

485. A "Cureall."—A patent medicine known as Radway's Ready Relief is one of the best "curealls" to take into the woods or upon a cruise. It takes the place of arnica and witch hazel for outward application to bruises, burns, cuts, etc., and taken internally it conquers chills and allays fevers. It is a nasty dose to swallow.

486. Emetic.—Gunpowder dissolved in water, frequent drafts of warm water, ground mustard and water, are all readily obtainable emetics. The last one is the surest. Mix a teaspoonful of ground mustard in a cup of water, give two or three drinks of it and follow up with twice the quantity of warm water.

487. Sunburn.—After having been exposed all day to the sun, do not wash the face at night, but wait until the next morning.

488. Chapped Hands.—Bathe in diluted vinegar, well rubbed in.

489. Blistered Feet.—Coat the inside of your socks (woolen are best) from ankles downward with common yellow bar soap, repeating the application for two or three days. Good either as preventive or remedy.

490. Cold Feet.—To keep the feet warm dust ground cayenne pepper in the shoes between the sock and the leather.

491. Diarrhoea.—Mix and drink a tablespoonful of wheat flour in a tumbler of cold water.

492. Bleeding from the Nose.—Check by applying cold water to face and neck, and holding a sponge soaked in cold water to the nostrils. Keep the head well back and do not blow the nose.

493. Poisoning from Poison Ivy.—Bathe in a strong lye made from wood ashes, or rub on the dry wood ashes alone.

494. Poisoning from Poison Ivy.—Take one pint bark of black-spotted alder, and one quart water. Boil down to one pint. Wash the poisoned part repeatedly.

495. Poisoning from Poison Sumach.—Apply strong salt and water, "as strong as can be made," to the affected parts.

496. Bite of Mad Dog.—Apply a ligature above the wound to retard the circulation, then suck the poison from the wound with the mouth, being careful that the lips are not chapped or cut, and that the matter extracted is immediately ejected. If no doctor is about, burn off the ragged edges of the wound with a white-hot iron or stick of nitrate of silver. Then put on a warm poultice.

497. Bee Stings.—Apply salt and water freely.

498. Snake Bites.—The whole idea of antidotes is bad and misleading. Any and every stimulant is an antidote physiologically to the depressing effect of the snake poison. So it will be well to give, say, two tablespoonfuls of whisky or brandy in three times as much water, along with twenty-five or thirty drops of *aqua ammoniae* or spirits of hartshorn, at such intervals as the depression may seem to demand. Clear the bowels by an enema of warm water and soap, to which may be added with advantage two teaspoonfuls of spirits of turpentine. If the patient has been bitten by a copperhead, assure him that the bite of that snake scarcely ever, if ever, imperils human life, and that he is in no danger. If bitten by a rattlesnake, tell him not to be needlessly alarmed; that the bite of this snake is seldom dangerous if left to itself, still less so if intelligently treated. Many persons bitten by snakes die of fright; some are killed by excessive medication, especially by fatal quantities of alcohol. Some few persons are so very susceptible to the influence of the venom, that they die of its effects with or without treatment. If we have in the United States a really deadly snake, it is the so-called venomous water moccasin of the Southern States.—*M. G. Ellzey, M.D.*

499. Unconsciousness from Injury.—Put the victim on his back and loosen the clothing. Administer hot brandy or whisky and water, a teaspoonful a minute, for ten minutes. If he remains unconscious, apply hot cloths or a hot stone wrapped in cloth to the feet, armpits and pit of the stomach.

500. Sunstroke.—This results partially from debility. Its first symptoms are violent pain in the head, pain and weight in the pit of the stomach, disordered vision and difficulty of breathing. When insensibility follows, take the victim to a cool, shady place, put him on his back, with his head slightly raised, loosen the clothing and douse with cold water upon face and chest.

until the temperature of the body is lowered and the face becomes pale. Then rub thoroughly dry, and give some stimulant unless the sufferer is of an apoplectic nature.

501. Sprains.—Bathe the sprain in hot water from 15 to 30 minutes, as hot as can be borne. Wrap then with flannel soaked with hot water and cover over with dry cloths. Then give the part perfect rest. If the ankle is sprained, keep the foot in a raised position on a pillow. A cloth saturated with arnica and water, or Radway's Ready Relief and water, bound around the part, will allay pain. In sprains of the wrist or elbows the arm should be supported in a sling. Splints have to be used sometimes for a sprain of the knee.

502. Dislocations.—Bones thrown out of joint in the fingers may be easily pulled into place, but other dislocations had best be put up in splints, the limb being always kept straight, until the doctor comes. Elevate the injured member to lessen pain from pressure of blood. Wet cloths and cold water applications will allay pain. To make splints see Hint 515.

503. Ruptured Muscles.—Straighten the limb and support the muscle with bandages. Keep the limb still for from one to three weeks for the fibers to reunite. If the muscle is moved without bandages being on it will be weak ever after.

504. Cramps.—Endeavor to straighten the limb, apply warm water and rub vigorously with the hand. If cramped while bathing make a sudden energetic effort to extend the muscles which are cramped.

505. Bruises.—Apply cold water, or weak arnica and water, or Radway's Ready Relief and water, to alleviate pain.

506. Burns.—If your clothes take fire, roll over and over as fast as possible on the ground or floor to extin-

guish the fire. If your wife's clothes take fire, throw her down and wrap your coat or a blanket around her, tucking it around the neck to prevent inhalation of flame. After smothering the flame douse her with water before smoldering embers eat into the flesh. If severely burned, cut off the clothing by cuts up and down so it will fall off. Don't pull it off, for the skin will come with it. If clothing sticks to the flesh in places, let it stick. Tear up your linen shirt or her calico apron, handkerchief, etc., dip the cloths into any kind of oil, and place them upon the burned parts. If you have no cloths, anoint with any kind of grease, butter, lard, etc., or powder the places with flour or starch. Use warm water rather than cold, and get a doctor quick.

507. Scalds.—Drench the victim at once with cold water, and then proceed as for burns.

508. Frost Bite.—Keep out of a warm room, remove clothing carefully, rub the frozen part with snow, or with ice water and wet cloths. Keep rubbing until circulation is thoroughly restored before warm cloths are applied or a warm room is entered. Get a doctor, as mortification may follow.

509. Wounds.—Lessen the bleeding as much as possible. Exert pressure immediately over the wounded part, and apply cloths soaked in cold water. If in hand or arm, hold above the head; if in leg or foot, lie upon the back and hold up the leg above the body. If the blood is bright red and comes in spurts, an artery is injured, and you must check the flow by pressure upon the artery between the wound and the heart. Wind cloth (your suspenders, if elastic, are better) tightly around the limb, one layer above the other, the bandage pressing the artery firmly. Pour on cold water to shrink the bandage. If the hemorrhage is severe, put a stick under the bandage and twist it tight until the bleeding stops. Let the doctor dress the wound when he comes, but meantime

cover it with a piece of linen or cotton moistened with cold water to protect it from the air.

510. Wounded Hand.—If a finger, press upon both sides above the wound; if the hand, press the artery in the wrist where the pulse is usually felt.

511. Wounded Arm.—Press the inner side of the upper arm, or bandage a block of wood under the arm very tightly.

512. Wounded Foot or Leg.—Check bleeding by bandage over the large artery on inner side of the thigh. Use the tourniquet or stick to twist the bandage tight.

513. Wounded Head or Face.—Press over the artery at the front side and base of the neck just above the collar bone.

514. Wound from Fish Fin.—One spoonful each of common salt and gunpowder and the white of an egg, mixed into a paste and applied to the wound; bandage as in other wounds. As mixture becomes dry, apply fresh until all poison is extracted. Keep the paste moist by covering with damp cloth.—*Wau-kau-mah.*

515. Broken Limbs.—When a bone is broken, the victim will not be able to raise the limb; it will be bent or shortened; and if an attempt be made to move it, it will bend where it ought not to. Keep the sufferer perfectly quiet and as comfortable as possible. To obtain as perfect rest as possible for the limb until the doctor comes, fasten it to some support. Splints may be made of sticks, laths, stiff cardboard, cigar boxes, etc. To make them conform to the shape of the limb, wind them thickly with strips of cloth, pieces of blankets, clothing, etc. On the splints place a padding of grass, straw or cotton wool, to prevent chafing. Cover the pads with cloth. Fasten splints to the limb by pieces of cloth, suspenders, handkerchiefs, etc.

516. Broken Upper Arm.—Make four splints, reaching from shoulder to elbow, pad well, and place one in front of the arm, the longest one behind, and one on each side. Bandage, and put forearm in a sling.

517. Broken Forearm.—Use two splints from elbow to the finger tips, one on the palm side of the hand and one on the back of the hand. Put the forearm in a sling across the body with palm inward.

518. Broken Thigh.—Instead of splints, bind both legs firmly together.

519. Broken Leg.—If the tibia is fractured it will show by the displacement under the skin at the front of the leg. Make a splint to reach from knee to bottom of foot. If the fibula (the bone concealed by the calf) is broken, bandage from the knee down, and the tibia will act as a splint.

520. Broken Collar Bone.—This fracture is indicated by an unusual projection on one side, with a drooping forward of that shoulder and pain in the region. Find a piece of log 2 or 3 inches thick and 6 inches long, and wrap cloth around it until you have a pad 4 inches thick. Place this under the arm next the fractured bone and bind the arm perpendicularly to the side by a bandage around the body.

521. Broken Ribs.—Fracture of one or more ribs is indicated by pain in the affected side when taking a full breath. Overlap the undercoat as tight as possible and pin or tie it tightly around the body. Let the sufferer lie on the affected side and get a doctor quick.

522. Restoring the Apparently Drowned.—To Remove Water from Lungs and Stomach. (Rule I., Fig. 1.)—Instantly place patient face downward, a hard roll of cloth being placed beneath the pit of the stomach, to raise it as much as possible above the level of the

mouth. Put one wrist of the patient under his forehead to raise his mouth off the ground. With hands well spread upon the patient's back, above the roll of clothing, throw upon it your whole weight with a forward motion, and keep up the pressure about three seconds, so as to force all water from the stomach and lungs out of the

FIG. 1



mouth, ending the pressure with a push which will help to jerk you back to your upright position. Repeat this once or twice, and then quickly proceed.

523. To Make the Patient Breathe.—(Rule II., Fig. 2.)—Turn the patient face upward, the same roll of clothing being now beneath his back, the shoulders slightly drooping over it. Bend head backward and downward, putting throat on the stretch to the utmost. Place the hands of the patient on top of his head (one twist of a handkerchief or string around the crossed wrists will keep them there). Rip or strip all clothing

from waist and neck. Now kneel astride the patient's hips. Grasp the front part of the chest on both sides of the pit of the stomach, your thumbs pointing to patient's chin, and your fingers fitting into the grooves between the short ribs. Fix your elbows firmly, making them one with your sides and hips, and then, firmly pressing

FIG. 2



the sides of the patient together, and using your knees as a pivot, throw yourself slowly forward for two or three seconds until your face almost touches the face of your patient, and your whole weight presses upon his chest. End this pressure with a short push which suddenly jerks you back again to the upright kneeling position. Rest three seconds while the ribs spring back; then repeat this bellows-blowing movement as before, gradually increasing the rate from seven to ten times a minute; but take the utmost care, on the occurrence of a natural gasp, not to interrupt it; but, as the ribs fall, gently press them and deepen the gasp into a longer breath. Continue this until the natural breathing, which you are imitating, needs no further assistance. If all fails keep on, because any moment within an hour's effort you may unexpectedly be rewarded with success. Avoid impatient vertical pushes; the force must be upward and inward,

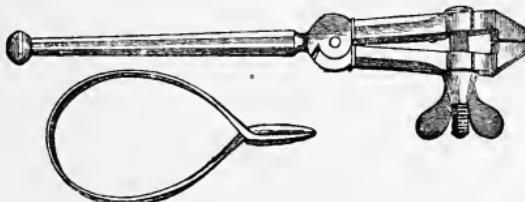
increased gradually from zero to the maximum the age, sex, etc., may indicate. If a second person be present and can do it, the tongue should be held out of one corner of the mouth by the thumb and finger, armed with a piece of dry cotton or linen rag (Fig. 2, a).—*London Lancet.*

CHAPTER VIII.

FLIES AND FLY MAKING.

Prepared for Forest and Stream by the Late Thaddeus Norris.

524. Tools.—If the learner's fingers are delicate and he has good use of them, it is better to dispense with some of the mechanical appliances used; but for one whose digits are clumsy or who lacks a free use of them, I would recommend the two simple little instruments drawn to one-half the actual size below. The vise, of course, is



for holding the hook; the smaller tool is a spring plier, or as some term it, a pair of pliers, for holding the end of a thread or hackle, and conveniently used for wrapping the latter on the hook.

525. Materials.—These of course, in quantity and variety, will depend much on the angler's wants as to the different flies—few or many—he may wish to produce. A country boy will go to his mother's hen roost and get all the feathers he wants, and by making a slight raid on his sister's work basket for silk and worsted, construct a very effective fly, rough and unkempt though it may be

to look at. I will mention nearly all the materials that I use myself and in the order in which they are applied to the hook.

526. Wrapping Silk.—The finer, if strong, the better; and although the color should in some degree correspond to the other material used, this is not of much consequence, as it is only seen in the few slight wrappings at the head of the fly.

527. Wax—Do not use “cobbler’s” wax, as some English writers on this subject call it, but beg or make a little expressly for the purpose. Take one ounce of the clearest and lightest rosin you can procure, one dram of gutta percha, and one teaspoonful of linseed oil—the crude, not the boiled—put them in a teacup (I use the lower part of a discarded tin blacking box), heat them, stirring with a little stick the meanwhile, to have them thoroughly amalgamated, and then pour the hot compound into a bowl of cold water. As soon as it has cooled sufficiently, work and pull it, much as girls pull “taffy;” this makes it light colored and tough. If the gutta percha cannot be easily obtained it may be omitted, but it adds to the toughness. To make the wax softer for cold weather, add a few drops of oil. To make it harder for warm weather, add, as you require, a little more rosin.

528. Hooks.—There is much difference of opinion as to their proper shape for flies. The point of the barb of the O’Shaughnessy has an outward projection. It is what is called a hollow point, and the chances of hooking the fish are thereby increased. The point of the Kinsey projects inward away from the line of draft, and is therefore less liable to catch than the Sneck bend, the Aberdeen or the old Kendal. Conroy imports the improved Limerick hooks to order, of lighter wire—from No. 6 to No. 12—than those he has for general sale, which I think are too stout, and rather clumsy. The Kirby, the hook-

ing quality of which is superior to all others, if short shanked, may be used for palmers and hackles, but for winged flies the sideward inclination of the point would give the wings of the fly "a list" to one side, and prevent its floating on an "even keel."

529. Gut—Should be fine for stretcher and stout for drop flies, for the latter using a half length. If the droppers are intended to be looped to the leader, the loops should be tied in each end of the length after soaking the gut, the projecting end pulled tight and cut off close, and then the length divided into two. Gut dyed a neutral tint, between a blue and lead color, is done as follows: Throw your hank of gut into a basin of cold water, and while it is soaking put into a small vessel—tin will answer—a pint and a half of water with 1 dram of ground logwood and 6 grains of copperas. After it has commenced boiling let it bubble 10 minutes longer; then, dashing the water from the gut, throw it in and press it down with a small stick. In 30 seconds or so lift it to see the depth of tint, and continue to examine and immerse it until it suits your fancy. A light tint I consider preferable. Some persons think that the dye affects the strength of the gut. This is not the case unless there is too much copperas; much more than I have prescribed.

530. Tinsel.—Gold or silver, as it is called, but really "Dutch metal," whether round or flat, is kept by variety or military stores, or the country reader can obtain the flat kind from some dealer in Irish linens, as it is frequently used, ornamentally, in putting them up.

531. Dubbing.—The materials, and they are many, of which the bodies of flies are wrapped are, first, and most important, peacock herl, or "harl," as some persons call it—the little plumelets or fibers growing on each side of the tail feathers of the peacock. The copper-colored, for nine flies out of ten, is preferable; the green is used

for fancy flies. The next is mohair, or the ravelings of a fabric called "moreen," or pig's wool, growing on certain parts of the animal beneath the bristles, or seal's wool, the most brilliant of all—all of which can be dyed of many colors; or the fur of a rabbit, squirrel, monkey or other animal. Add to these wrapping floss silk, and the list, I believe, is complete.

532. Hackles.—The hackle is intended to represent the legs of a winged fly, or without the wings some imaginary caterpillar insect, which trout take for a reality. There are saddle and neck hackles. The former are the long streamers growing on each side of a cock's rump, the latter are plucked from the back of the neck—the closer to the head the shorter the hackles and stiffer the fibers. Having stouter stems than the saddle hackles, they are less apt to break in winding on. The older the cock the stiffer the fibers; but as old cocks are not always obtainable I avail myself of the good terms I am on with several poultry dealers to pluck the heads and necks of their capons. Natural hackles are more generally used in tying trout flies than others. Then there are those the fibers of which are red at the stem, or say at the roots, and black on the outer edges of the feather, and frequently black at the stem and red at the outer edges; both of which are called furnace hackles. There are also light yellowish red, termed "ginger hackles." Black hackles are essential in tying dark flies. Gray are used in tying dun-colored flies when dun hackles, which are very scarce, are not to be had. Add to these the ginger-barred and black-barred on a white ground, and we have most of the natural or undyed colors. The feathers from the wren's tail, from the ruff of the grouse, from the partridge and snipe, and the short spotted feathers of the guinea fowl are occasionally used, but they are soft of fiber and poor substitutes for cock's hackles.

533. Wings.—The feathers of which the wings of

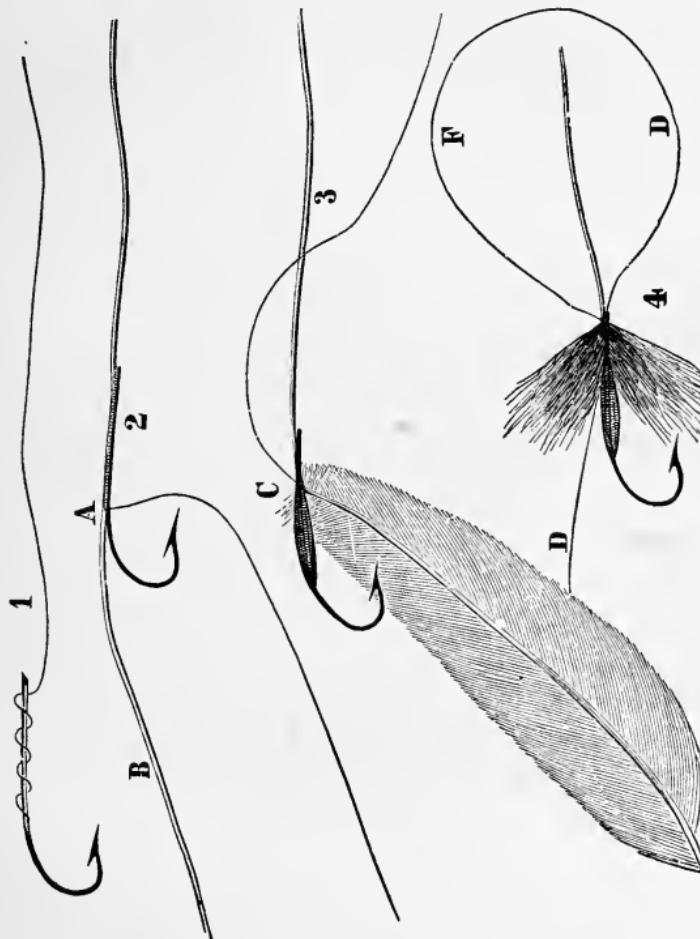
flies are made are numerous. Those of the mallard, teal, redneck, sheldrake, woodduck and other wildfowl correspond in position to the saddle hackles of the cock, and are what ornithologists term "tail coverts." Few others, except the secondary wing feathers of the redneck, canvasback and teal are used. The tail coverts of ducks are difficult of manipulation on account of their extreme delicacy and lightness. Of all feathers from the wings of birds or domestic fowls, the secondary only are good; the pinions are worthless. If a man's arms were wings the pinions would be found growing from the wrist to the tips of the fingers, the secondaries from the elbow to the wrist. The great variety of plumage in domestic fowls produced by crossing and interbreeding has furnished some invaluable feathers to the fly-maker, especially to the beginner; these are in nearly every case the secondaries of hens. They are much easier of manipulation than the tail coverts of wild ducks or the short-fibered wing feathers of birds, and in all cases should be used instead by the tyro when he can get them near the shade or markings of any duck's feathers he may admire. The Earl Derby, the dark brahmas, and most of the various crossings producing so many shades of brown and mixed colors furnish them. White secondaries are used for the wings of the moth fly or white miller, as also for the coachman. Dun feathers are almost as difficult to procure as dun hackles. Red ibis of course will be seized on, as well as the crest, ruff, back and breast feathers of the golden pheasant. Turkey, the secondary and tertiary, as well as the tail feathers, also come into play; so also do some of the wing feathers of the wild goose. English bluejay, macaw and parrot, and golden pheasant are used almost entirely in tying salmon flies. The guinea hen may also be included.

534. At the Work Table.—When seated at the table where you are to tie your flies, have two paper

boxes, each about 16 inches long, 4 deep, and 5 wide. On removing the top, the sides toward you fall by little muslin hinges on the table. The boxes are divided by little pasteboard uprights, each into five apartments of equal width. In the first apartment of the box on the left are bits of feather used for the tails of flies, viz., the tail coverts of mallard, teal, sheldrake and woodduck; feathers from the crest, ruff, back and breast of the golden pheasant, red ibis, parrot, macaw and a few dyed feathers. The second, third and fourth apartments are for the feathers for wings, and the fifth contains hackles. These feathers are neatly folded in slips of paper, and placed in large sized envelopes, which have the names written at the top of the back. They set edgewise in the box, with the inscriptions all facing the same way, so that by passing the fingers over them you can easily find the feathers you are about to use. The box to the right contains, each in its proper apartment, hooks in little boxes, the size marked on top and bottom, hand vise, spring pliers, picker, wax, a pair of sharp scissors $3\frac{1}{2}$ inches long with blades 1 inch long and $\frac{1}{4}$ inch wide, a small flat piece of India rubber for straightening gut, wrapping silk of various colors and degrees of fineness, floss silk, peacock and ostrich herl, and the different kinds of dubbing as enumerated in Hint 531. Such methodical arrangement, while not necessary, will prevent confusion.

535. Tying a Hackle.—Suppose, first, we tie the simplest hackle, say a ginger on a No. 6 hook. If you use the vise, fasten the hook between the jaws, then take a piece of wrapping silk of the required length, say a foot or 14 inches, and rolling a mite of wax as large as a BB shot between forefinger and thumb, draw the silk through twice. With the hook in the position shown on the annexed illustration, whether held by the vise or between the thumb and forefinger of the left hand, take five or six

turns around the shank of the hook, as shown in Fig. 1. Then, laying on the gut, commence quite close to the head and wrap down to *A*, Fig. 2. Here, with three



turns of your wrapping silk, fasten in the floss, *A B*, and laying the wrapping silk along the shank, tuck it in between the gut and the head of the hook, and throw a few loose coils around the gut to keep it out of the way. Now wind on your floss as far as *C*, Fig. 3, increasing the bulk of the body somewhat as you proceed; then throw the

loose coils of wrapping silk free from the gut, and take three turns over the floss and clip off the end. You next take your ginger hackle, about the length figured, and stroking back a few fibers at the point and clipping off the end, lay it against the hook and fasten in with four or five turns and wrapping up to within a sixteenth of an inch or so of the head, throw a few loose coils around the gut as before. Now wrap on your hackle closely, pressing back the fibers as you go to avoid overlapping them. On getting as near the head of the hook as shown in the illustration, fasten the hackle with two or three turns, clip off the ends, and throwing the wrapping into coil *DFD*, seize it at *F* and take as many turns as will come to the very end of the shank. Now reversing the turns, with the gut through the coil, you draw on the end *D* until the wrapping forming the coil is drawn tight. Your fly now after clipping off the surplus wrapping is complete, needing only a touch of copal varnish, with a small camel's hair brush at the head to make it secure. The tying of this simple hackle is the all-important rudiment of the art.

536. A Hackle with Tinsel.—Go back to Fig. 2 and suppose *AB* a strip of flat gold tinsel, which you have fastened in with three turns of the wrapping and thrown the latter in a few loose coils around the gut. Take three turns of the tinsel, perhaps four, or even five if the hook is large, down the shank closely, so as to hide the hook, and then as many turns back, and after fastening with two or three turns of the wrapping, cut off the end of the tinsel. We will vary the body of this hackle by having it of peacock's herl. Take four or five herls between the thumb and finger of the left hand and clip them off evenly, lay them on where you have just clipped off the tinsel, and take two or three turns over the ends which project toward the head of the hook. Now, laying your wrapping silk along the herls, twist both herls and wrap-

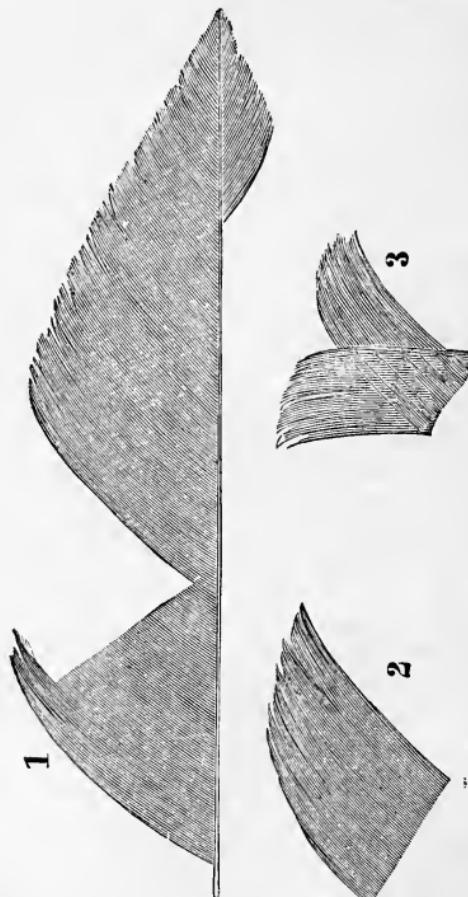
ping silk slightly, winding in the meanwhile as far up the shank of the hook as you intend the body to extend, then fastening in the hackle proceed as already described.

537. Bodies of Other Material.—Fur, mohair, pig's wool and seal's wool are spun on in the same way. A raveling of any fabric, for instance moreen, may be fastened and wound on as floss silk. In making a very large body to a fly it is a matter of economy when using floss silk, to wrap first with darning cotton, or similar material. It matters but little as to the color, as the floss covers it. In making a body of mohair, fur, or pig's wool, the requisite quantity, after a little pulling, is placed in the palm of the left hand and rolled into the shape of an oblong cone. The smaller end is then applied to the lower end of the body, and twisting or spinning it in with the wrapping silk, it is wound up the body, which is to be increased in bulk as you near the space intended for the hackle. The wild hairs of the dubbing should be clipped off, so also should awry fibers of the hackle after winding on. The picker (a darning needle, head stuck into a small cork, will answer for this little implement), when required, is brought into requisition in arranging and straightening the irregular fibers after winding on the hackle.

538. Palmer Hackle.—To make a palmer hackle proceed as instructed to *A*, Fig. 2; and after putting on the tinsel, if it is required, fasten in the tip end of the hackle, then the material of which the body is composed. Now you have tinsel, hackle and dubbing tied in, and the rule is that the material fastened in last is wound on first, so you wind on your dubbing, fasten it a little below the head of the hook, and then taking three, four or five turns of the tinsel in the same direction, you fasten it also. Now you wind on your hackle just behind and close to the tinsel, and as you get near the head of the hook disregard the tinsel and take a few close turns of

the hackle, fastening it, clipping it off and finishing as already directed. In a palmer the fibers of the hackle should stand out much thicker at the shoulders and head of the fly than along the body.

539. Making the Wings.—From the accompanying cut it will be seen that the fibers incline toward the top end of the feather. Now, each of these, on the sides



where they come in contact, if examined with a microscope, will be found to contain a regular series of little

hooks, if I may so call them, forming a connection or interlocking with a similar series on the adjoining fiber. If you cut out a section (Fig. 2), and doubling it form Fig. 3, the fibers at the outer end of your wing will be of an unequal length and require pinching or clipping off of the ends after it is tied on. You will therefore, holding the stem of the feather in your left hand, stroke back the fibers gently and gradually, forcing the little hooks to lose the original connection with their fellows on the adjoining fibers and form others, until you get them to stand out at right angles with the stem. After forcing as many back as will form your wing, clip them off with your scissors and double them with the under side of the feather inward, and your one wing, representing a pair of wings, is ready to tie on.

540. Wings.—A certain school of fly makers tie on the wings, or more properly the wing, last of all, and in making an elaborate fly it is the proper way, but in ordinary trout flies the wing should be put on immediately after wrapping on the gut. Some old-fashioned makers maintain that a pair of wings should be put on, each one separately. This is certainly unnecessary, for most of the natural flies we observe on the water, if alive, have their wings folded together, appearing as one. Especially is this the case with the *Ephemeridae*, which are most numerous.

541. Putting on the Wings (English Method).—If it is the last thing done, holding the smoothly folded mass of fibers together between the thumb and forefinger of your right hand, lay it on the back of the hook, the ends of the fibers extending as far back as you propose to have the length of the wing, pressing it down firmly: then bring the forefinger and thumb of your left hand into action, and releasing the hold with your right, take two or three turns of your wrapping silk; look to see if it sets right, and then with one or two more wrappings,

close and neat, you fasten off with the invisible knot, as described in Hint 535, and so your fly is complete.

542. Putting on the Wings (the American Method).—Holding the hook as already described, take four or five turns of the wrapping silk about two-thirds of the way up from the bend to the head, then laying on the gut, continue wrapping, but closely, leaving just enough of the hook to fasten and finish off; lay on the wing, the convex edge beneath, and the end in the reverse direction, *i. e.*, outward along the bare gut; then, holding the wing firmly in position, take two or three turns of the wrapping, being careful that the wing does not turn over toward the opposite side of the hook (look at it to see that it sets properly); continue down the shank with a half dozen or more turns, and then clip off the root ends of the fibers, which of course are pointing toward the bend of the hook. Your wing is now secure, with the point or end reversed. Continue wrapping over gut and hook until you come opposite the point of the latter; then put on your tinsel, clipping off the surplus end, then your dubbing, extending it well up toward the head, and leaving the space to be occupied by the hackle about half as much as that so occupied when tying a fly without wings. Here you fasten in the hackle firmly, winding it on up to the point where you commenced tying on the wing; secure the end of the hackle with three turns of your wrapping, clipping off the surplus end, then double back the wing into its intended position, take two or three turns over the head or butt end, and finish off with the invisible knot.

543. Putting on the Wings (Shorter Method).—A quicker way of putting on the wings is, after stroking back the fibers, and bringing them at right angles to the stem of the feather, to double them into the shape of the wing, and then, with a quick jerk, pluck it by the roots from the stem. The wing is then laid on, and the fly pro-

ceeded with as just described. The wing should extend backward just so far that the tip of it comes immediately over the bend of the hook. The fibers of the hackle should hardly be long enough to reach the same place, and the hackle itself should not be more than two-thirds the length of stem required for a hackle or palmer fly.

544. Facts about Wings.—One would suppose, before he tried it, that the wing cut or torn from the stem, as described, would be square at the tip end when tied on. A trial will prove that the end will be oval or elliptical, resembling the wings of a natural fly. The learner, of course, will find that in tying back the wing, if the turns of the wrapping silk are too near the butt end of the head, the wing will set too perpendicularly, and that if the turns of the wrapping are too far back it will set too close to the body. The body in a well proportioned fly extends rather beyond, opposite the point of the hook. If the wing is too long it should be shortened by a vigorous pinch of the thumb nail and forefinger.

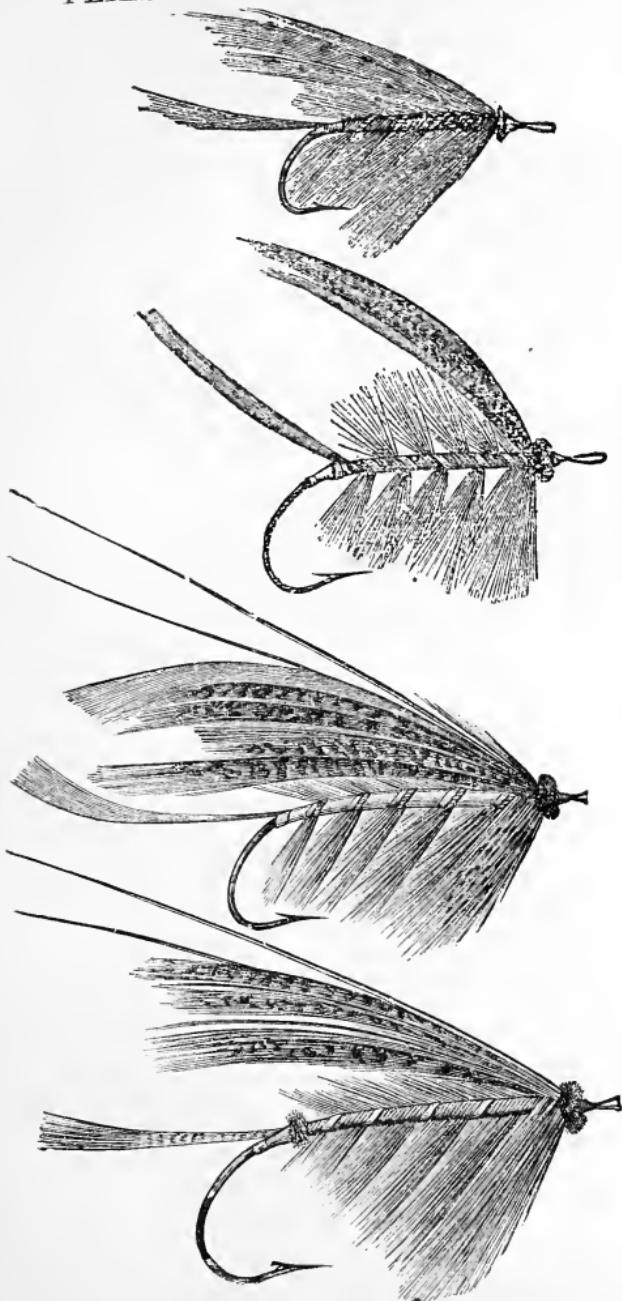
545. Wings with Floss Body.—The mode of clipping off the butt ends of the wing close up to the head of the fly answers in most cases, for instance for a herl, or mohair, or fur body, but when we intend to make a floss body, the surplus part of the wing should be clipped off in a direction slanting toward the bend of the hook; so that in wrapping over it with the floss the body will taper, handsomely increasing in bulk as it nears the place where you intend to fasten in the hackle. In tying flies one becomes appreciative of the minuteness of spaces, and in putting on tinsel, or in the length of the body, or in finishing off at the head as much as may be occupied by one or two turns of the finest wrapping silk is easily judged of.

546. Tails.—In putting on the tail much nicety is to be observed. Of course it is placed precisely on top of

the hook, and the fibers of feathers of which it is composed should curve upward and set gracefully. If it be a plain body, as in the fly called the hare's ear, it is tied in on completing the wrapping on of the gut. If tinsel ornaments the end of the body, it should be put on first and then the tail. If the body is intended to be wrapped with tinsel, it should hang loose while putting on the tail, and then wound spirally over the dubbing with two, three, four or five turns, as the case may be.

547. Fastening and Wrapping.—Remember that the material fastened in last is wrapped on first. Suppose, for instance, you wish to make a winged fly with a palmer body. After the tail is on, tie in the end of the hackle, and then—firstly, wrap on the dubbing; secondly, the tinsel; thirdly, the hackle, following closely behind the turns of the tinsel; and it makes a better looking fly to wrap the hackle much more closely on, getting up under the wings, making it a little more “buz,” as it is frequently termed. A fly is said to be *buz* when the hackle is wrapped on thick and it looks “bushy.” Some makers use two or three half hitches in finishing off at the head. The invisible knot is as easily tied and much more secure.

548. Salmon Flies.—The cuts of salmon flies given here are copied from “The Book of the Salmon,” with the exception of the second. They are introduced to show what are “feelers,” and “toppings,” and “loops,” and “collars,” “heads and shoulders,” “tags,” etc. We scarcely ever use a more elaborate salmon fly than the second for the waters of the Dominion. A salmon fly or one of Whitney's flies tied for the Maine waters, the “toodlebug,” for instance, or one of my own mixed wings made for the same waters, unless the river was very high, would scare all the Nipissiquit or Cascapedia or Restigouche salmon out of a pool. A knowledge of the technical names of the minor appurtenances of a



salmon fly is not essential to one who plies his 17-foot withe, or scarcely to one who makes his own flies for American rivers, but to be thorough we must name all the little adjuncts and accessories. The third and fourth flies depicted are much too large for the rivers of Canada at an ordinary stage of water. The third might do on very high water after it has gone down just enough for the fish to commence noticing the fly.

549. Parts of the Salmon Fly.—Examine the third figure. The tail is what is usually called a “topping,” *i. e.*, feather from the crest of the golden pheasant. The body is wrapped with floss silk, ribbed with gold twist, *i. e.*, stout gold thread, which is followed by a hackle almost to the head, where, as will be observed, another feather is tied on, a bluejay, for what is termed a “shoulder.” There is a mixed wing of golden pheasant neck, teal, guinea hen and light brown turkey, with a topping much longer than the tail surmounting the wing. The head is of black ostrich herl, wound on closely, both for ornament and to hide the butt end of the wing where it is clipped off. Referring to the fourth figure, a “tag” just at the butt of the tail. A tag may be of ostrich herl, or pig’s or seal’s wool, or floss. The “feelers”—which by a great stretch of imagination are supposed to represent the antennæ of a natural fly—are the two long fibers of macaw tail feather tied in on each side of the head and extending back over the wings; and another stretch of imagination is to suppose that a natural fly carries them thus.

550. The Nicholson Fly.—The second figure is a very plain fly, the “blue and brown,” or Nicholson, named after an old salmon fisher, “a broth of a boy,” of St. Johns, New Brunswick. There are a few turns of flat gold tinsel, or gold twist, then a tail of mallard and golden pheasant’s ruff; the body of reddish brown seal’s or pig’s wool, wrapped with a blue and reddish brown

hackle; the wings are of mallard, and, according to Mr. Nicholson's style of tying, stand well up. The size of the hook given is for high water, when the dubbing and hackles are of lighter shades. As the water falls the hackles and dubbing should be darker. On low water and bright weather dark brown and purplish blue are best; the hook decreasing in size as the water falls. In fact, trout hooks numbers 3 and 4 (Conroy's O'Shaughnessy's numbers) are, as a general rule, large enough for the rivers of Canada; numbers 1 and 2 are full size for high water.

551. Materials for Plain Salmon Fly.—Take a fly with one hackle, say the "fiery brown." Lay all the materials before you—a short topping for tail, a bit of gold twist (3in. or so), fiery brown dubbing of mohair or pig's or seal's wool, a hackle of redder shade than the dubbing, the wing ready folded, a plumelet of ostrich herl, a bit of blue and yellow macaw tail feather, and a gut loop. The latter is so cut that when doubled it will be long enough to come about where the tail is tied on, the ends to be beveled, and, bending it over a coarse needle or an awl, an eye should be formed, as is not represented in the illustration. The wings of a salmon fly, as a general rule, should be double, or say two-ply, for mallard, of which most wings are made, is very light, and requires delicate handling. In preparing it, stroke back the fibers gently and firmly un'il all their ends are square, clip off with your scissors, and lay it on the table; prepare another in the same way, and lay it on top of the first, placing it where it is not apt to be disturbed.

552. Tying the Fly.—Use the small vise. Firstly, secure the hook well between its jaws; secondly, wax your silk, and commencing near the bend, wrap up to the head with a dozen or so turns; thirdly, laying on the gut loop warp down opposite the bend, perhaps a few turns below; fourthly, lay on the gold twist, secure the end, and

winding it three or four turns back, opposite the point of the hook, fasten it, allowing the surplus to stand outward toward the head; fifthly, put on the topping for tail so that it curves handsomely upward and secure it with two turns of the wrapping silk; sixthly, fasten in the tip end of the hackle, the back uppermost; seventhly, having pulled and picked your dubbing and rolled it in the palm of your hand into a conical shape (very little is required), twist in the small end with your wrapping silk, and spinning both silk and dubbing almost up to the head, fasten with a half hitch; eighthly, twirling your vise, follow with four turns of the gold twist, fasten, and then follow close behind with the hackle, the under side next to the dubbing. You are now ready to put on the wing. There are two ways—one is, after doubling it to tie it on as described; another is, not to double but to lay it flat on the top of the hook with the forefinger and thumb of the right and compress it with the corresponding fingers of the left hand; bending the two edges of the wing so that an equal proportion will enfold the hook on both sides. Now with your wrapping silk take two turns; look to see that the wing is put on evenly and sets properly. and taking a half dozen more turns make it secure with a half hitch. Putting on the feelers to have them set uniformly is a nice job. The pair should be taken from opposite sides of the blue and yellow macaw tail feather; that on the far side to be fastened in with two turns of the wrapping, then that on the near side. In making the head, observe that the black ostrich herl has a convex and concave side, and is to be wrapped on very closely with the convex side outward toward the eye of the loop. Clip off the surplus butt end of the herl and fasten with the invisible knot. With a small sharp stick dipped into copal, varnish the last wrapping of the silk, being careful not to let it touch the herl. When mallard is scarce the under 'ply of the wing may be of turkey, making it more solid than if it was all mallard. As a rule salmon flies are wrapped,

palmer fashion, that is, the hackle over the whole length of the body. The bodies, as will be observed, are very slender in proportion to the size of the fly.

553. The Scissors in Fly-Making.—Do not put your finger and thumb into the bows or oval openings, but lay that part of the implement in the palm of your hand and with the thumb and fingers work the blades. A little practice in this way will enable one to pick out and clip off a single fiber of the hackle or wing with great nicety.

CHAPTER IX.

MISCELLANEOUS.

554. Tight Shells.—If cartridges become swollen with dampness and fit too tight, sprinkle them with powdered soapstone.

555. Gun Cleaner for the Field.—To the end of a cord a little longer than the gun barrel tie a small lead sinker; to the other end tie a bunch of cloth that will fill the barrel tightly. Drop the leaded end through the barrel and pull the cloth after it.

556. Loads for Game.—The U. M. C. club shells are loaded as follows.

Adapted to Shooting	10-Gauge.				12-Gauge.			
	Powder drs.	Shot oz.	Size shot.	Powder drs.	Shot oz.	Size shot.		
Woodcock.....	3 $\frac{3}{4}$	1	10	3	1	10		
Woodcock.....	4	1 $\frac{1}{8}$	10	3 $\frac{1}{4}$	1	10		
Snipe	4	1 $\frac{1}{8}$	9	3 $\frac{1}{4}$	1 $\frac{1}{8}$	9		
Quail	4	1 $\frac{1}{8}$	8	3 $\frac{1}{4}$	1	8		
Quail and prairie chicken.....	4 $\frac{1}{4}$	1 $\frac{1}{8}$	8	3 $\frac{1}{4}$	1 $\frac{1}{8}$	8		
Prairie chicken.....	4 $\frac{1}{4}$	1 $\frac{1}{4}$	8	3 $\frac{1}{2}$	1 $\frac{1}{8}$	8		
Bluerock, Ligowsky, etc.....	4	1 $\frac{1}{4}$	8	3 $\frac{1}{4}$	1 $\frac{1}{4}$	8		
Live pigeons, etc	4 $\frac{1}{2}$	1 $\frac{1}{4}$	8	3 $\frac{1}{2}$	1 $\frac{1}{4}$	8		
Ruffed grouse, teal, etc.....	4 $\frac{1}{4}$	1 $\frac{1}{4}$	7	3 $\frac{1}{2}$	1 $\frac{1}{8}$	7		
Pintail and bluebill.....	4 $\frac{1}{4}$	1 $\frac{1}{4}$	6	3 $\frac{1}{2}$	1 $\frac{1}{8}$	6		
Mallard	4 $\frac{1}{2}$	1 $\frac{1}{4}$	5	3 $\frac{1}{2}$	1 $\frac{1}{8}$	5		
Reahead.....	4 $\frac{1}{2}$	1 $\frac{1}{4}$	4	3 $\frac{1}{4}$	1 $\frac{1}{8}$	4		
Canvasback.....	4 $\frac{1}{2}$	1 $\frac{1}{4}$	3	3 $\frac{1}{4}$	1 $\frac{1}{8}$	3		
Turkey.....	5	1 $\frac{1}{8}$	2	3 $\frac{1}{4}$	1 $\frac{1}{8}$	2		
Goose and brant.....	5	1 $\frac{1}{4}$	BB	3 $\frac{1}{4}$	1 $\frac{1}{8}$	BB		

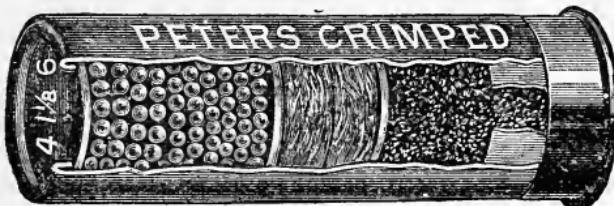
557. Shot.—American standard sizes: Fine dust, $\frac{2}{100}$ inch diameter; dust, $\frac{4}{100}$ inch; No. 12, $\frac{5}{100}$ inch; No. 11, $\frac{6}{100}$ inch; No. 10, $\frac{7}{100}$ inch; No. 9, $\frac{8}{100}$ inch; No. 8,

$\frac{9}{100}$ inch; No. 7, $\frac{10}{100}$ inch; No. 6, $\frac{11}{100}$ inch; No. 5, $\frac{12}{100}$ inch; No. 4, $\frac{13}{100}$ inch; No. 3, $\frac{14}{100}$ inch; No. 2, $\frac{15}{100}$; No. 1, $\frac{16}{100}$ inch; No. B, $\frac{17}{100}$ inch; No. BB, $\frac{18}{100}$ inch; No. BBB, $\frac{19}{100}$ inch.

558. Wood Powder Cartridges contain the following proportions of powder and shot:

Gauge.	Quantity of Powder, drams.	Quantity and Size of Shot.
12	$3\frac{1}{2}$ Primed.	$1\frac{1}{8}$ oz. No. 7 7 Trap & 8 Shot
12	$3\frac{3}{4}$ to 4, "	$1\frac{1}{8}$ to $1\frac{1}{4}$ " No. 7 7 " 8 "
10	4 to $4\frac{1}{2}$, "	$1\frac{1}{4}$ No. 7 7 " 8 "
10	$4\frac{3}{4}$ to 5, "	$1\frac{1}{4}$ No. 7 7 " 8 "
12	$3\frac{1}{4}$ Extra Strength.	$1\frac{1}{8}$ No. 7 7 " 8 "
10	$4\frac{1}{4}$ " "	$1\frac{1}{4}$ No. 7 7 " 8 "

559. Reamed Cartridge.—After the paper shell is loaded the end should be cut off evenly about half an inch above the wad. The shell should be turned down

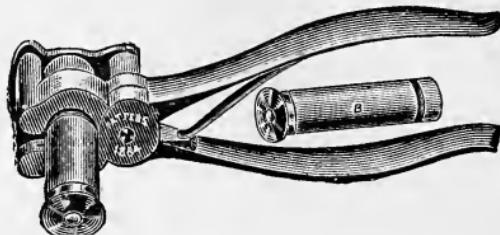


smoothly and firmly on to the wad, as shown in the cut. Tools for this purpose are supplied by gun dealers.

560. Indented Cartridge.—This shell should not be cut down. The paper shell is cut out and turned over on to the wad, as shown in the cut.

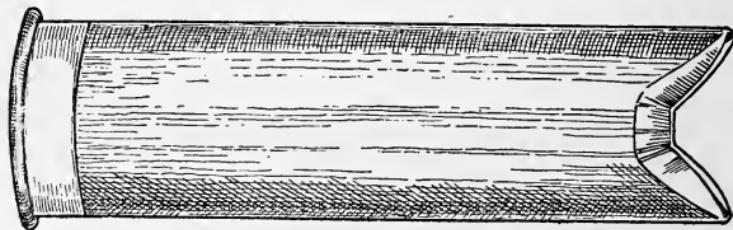


561. Creased Cartridge.—This shell should not be cut off at the end. The creasing is made just above and



pressing on to the wad. The cut shows the machine and the creased cartridge.

562. Crimping Shells.—A simple way to crimp shells, and one which has worked well, is to simply press



down two opposite sides of the shell (with the back of a pocketknife) upon the charge, leaving the shell with two projecting points, as in the cut.

563. Creedmoor Targets are divided into three classes, and are of the following sizes: 1. *Third Class*, to be used at all distances up to and including 300 yards, target 4×6 feet; bullseye, circular, 8 inches in diameter; center, circular, 26 inches in diameter; inner, circular, 46 inches in diameter; outer, remainder of target. 2. *Second Class*, to be used at all distances over 300, to and including 600 yards, target 6×6 feet; bullseye, circular, 22 inches in diameter; center, circular, 38 inches in diameter; inner,

circular, 54 inches in diameter; outer, remainder of target. 3. *First Class*, to be used at all distances over 600 yards; target 6×12 feet; bullseye, circular, 36 inches in diameter; center, circular, 54 inches in diameter; inner, square, 6×6 feet; outer, remainder of target. Bullseye counts 5, center 4, inner 3, outer 2. *Standard American Target* is divided into circles, the innermost one of 3.36 inches diameter (counting 10), the next one 5.54 inches (counting 9), 8-inch circle (counting 8), 11-inch circle (counting 7), 14.80-inch circle (counting 6), 19.68-inch circle (counting 5), 26-inch circle (counting 4), 46-inch circle (counting 3), and remainder of target, 4×6 feet, counts 2.

564. Rifle Cartridges are described by the caliber, the powder charge and the weight of the bullet; thus, .32-40-185, which means a .32-caliber shell loaded with 40 grains of powder and a bullet weighing 185 grains.

565. Long-Range Rifle Positions.—The natural position at long-range, where it is desired to get the very steadiest hold on the rifle, is that shown in Fig. 1. It is



FIG. 1.

the old deer-stalker's position and is assumed by every marksman when he first drops for a shot from the ground. It was the position taken by all the long-range small-bore experts when this class of work first opened at Creedmoor and Wimbledon. It was soon found, however, that the long overhang of the barrel made steady holding difficult, and there was a searching about for a manner of holding which would come within the rule of any position without artificial rest and yet give the shooter a steadier control of his weapon. Yale and Fowle

of the old time Creedmoor shots, Milner of the Irish team when that body came over, each had very easy rests.



FIG. 2.

The Farquharson position of Wimbledon was introduced in this country by Major Fulton and is shown in Fig. 5.

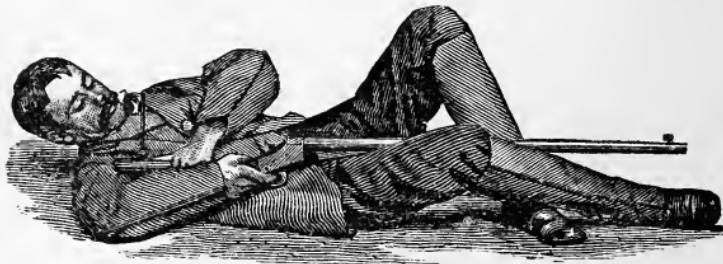


FIG. 3.

Blydenburgh had a position in which the recoil of the gun was taken up by the hands, as shown in Fig. 4.



FIG. 4.

W. Burnham of Chicago had a peculiar twist illustrated

in Fig. 2. There were dozens of various twistings of the human body and some were very acrobatic. Each



FIG. 5.

shooter found that he could get the easiest and steadiest grip on his rifle by taking a certain position. With the rear sight set on the heel of the butt a long line of sight was made possible, and this arrangement could be secured



FIG. 6.

in several of the positions assumed. With military rifles the sling came in as a factor in taking up a position. Thrown over the knee or with the foot in the loop the recoil was taken up by the legs and the body left clean of



FIG. 7.

shock, while a long sight could be taken without keeping the body in a constrained position and without having

the heaving of the chest in breathing throw the sights out of line with the target. In long-range position, what was very convenient for one was the very reverse for another.

566. Tubular Bullet.—A Mr. A. Weed recently sent to the *Forest and Stream*, one of his bolt bullets in which he leaves an opening down the entire length. He has made them of several calibers, .38, .40 and .45, and in each case the work has been of the best sort. The front of the bullet is cut square off, and the forward end slightly countersunk; an opening of about one-third the diameter is then carried down the center of the bolt, leaving a heavy tube of about the same weight as the ordinary bullet. When fired it is found to fly with a very low trajectory, and when hitting any hard substances, as a plank, the hole is cut clean and neat in outline, but when fired into a log, and the log is split for examination, the superior destructive powers of the new bullet are at once shown.

567. Split Bullet.—A form of bullet to secure smashing effect is shown in the accompanying cut. The



head of the bullet is split down, as illustrated, and the cuts are filled with tallow or wax.

568. Dog's Temperature.—The dog's normal temperature is 99.4° Fahrenheit. The temperature is ascertained by holding a clinical thermometer between the fore shoulder and the trunk (*axilla*).

569. Exercise for Dogs on Chain.—Run a wire from stake to stake and as long as the yard will allow; attach the dog's chain to the wire by a sliding ring, so he can run back and forth from one end to the other.

570. To Kill a Dog Humanely.—If it is necessary to kill a dog by shooting, the ball should be delivered



at the point and in the direction shown by the dotted line in the accompanying diagram.

571. To Kill a Horse Humanely.—A horse may



be killed by shooting, in the most expeditious and merciful manner by striking the spot shown in the cut herewith.

572. Gun-Shyness.—While our pup is still young he should be taught to love the sound of a gun. This can be easily accomplished if the proper course is pursued. In the first place we take a couple of old tin pans, and while his attention is attracted by something that interests him we strike them together, lightly at first; and if he appears to be afraid we are very careful not to add to his fright by a repetition of the noise anywhere near him, but take the pans quite a distance from his pen and leave them, and wait awhile before trying again. When it is time to feed him we go to the pans, and while sounding our whistle, as before described, to let him know that we are coming, we give a stroke just loud enough for him to hear plainly, and at once proceed to his pen and give him his feed. By pursuing this course for a few days, and gradually going a little closer every time, he will become accustomed to the sound, and learning that the noise is connected with our coming, and also his dinner; he soon gets used to it, and in a short time will stand the racket without flinching. When he has become so accustomed to the noise that he shows no signs of fear at quite a loud crash it is time to try him with the gun. In order to do this understandingly you will require an assistant. Let him take the gun loaded with a light charge of powder and at some little distance—say forty or fifty yards away—and be ready at your signal to fire. You will now enter his pen, and after he gets a little quiet call him to you and put a piece of meat before him and bid him *Toho*, at the same time raising your hand as a signal for the gun. Carefully watch him, and should he display any sign of fear the experiment must be repeated as with the pans. There is no need of your presence only to notice how he behaves, and you can dispense with your assistant, unless, as will probably be the case, he does not mind the report, when the gun can be brought nearer, and you can make another trial. Great care must be taken not to frighten him with too loud a discharge,

nor should it be too close to him, until he gets used to it. By paying close attention to him when under fire, you can readily tell how far it will do to go, and by properly conducting your experiment you can soon teach him to love the sound of the gun, even when fired over his head; indeed, we have cured in this way some of the worst cases of gun-shyness that we ever saw. Comparatively few dogs are gun-shy, and it is with these only that those precautions are necessary. After your pup has been carefully accustomed to the noise, do not lay your gun aside as soon as you have accomplished your object, but let him hear the sound occasionally until his education is complete, taking good care that the discharge of the gun is at once followed by something pleasing to him —his dinner, for instance—or let it be a prelude to giving him his liberty, thus giving him to understand that the noise means something, and soon the noise, or even the sight of the gun, will cause him pleasurable emotions that he will never forget.—*Hammond's "Training vs. Breaking."*

573. Otter Trapping.—A narrow-necked peninsula in the bend of a creek or river is almost certain to be crossed by the narrow path of the otter, and a point of land extending out into a lake is a favorite romping place. Where the slide of the otter terminates at the edge of the water is the safest place for the new beginner to set his trap, provided that the slide shows that the animal always enters or leaves the water at the same place. If the water is shallow at the bank of the lake or stream, the trail often spreads out on approaching the water, showing that the otter enters the water at any one of half a dozen places. Such a spot is to be avoided.

574. Water Set.—Get a Newhouse trap, No. 3 in size, go to the spot, either in a boat or by wading along in the edge of the water from a point on shore three or four rods distant from the otter's trail, having the trap

opened ready for setting, and a strong stake well sharpened inserted in the ring of the trap chain. Now we are ready to set the trap without making any disturbance above water. Arrived at the spot, select the point where it appears that the otter will step when next he comes that way, and in water about 6 inches deep, smooth the bottom to make a good place for the trap; place the trap so that the jaws will spread out on each side of the otter's line of approach, extend the chain full length up or down the stream, and, with a hatchet brought for the purpose, drive the stake firmly into the bottom, with the top of the stake driven below the surface of the water. Then if the top of the stake is bright in color like green timber, gather some mud from the bottom and smear over it. Now gently sift some mud in the water above the trap, until a very thin coat of soft mud hides any brightness of the trap from view. Wade back to where the stream was first entered, having been careful not to touch the bank, and the trap is set in the manner known as the "water set." Another good water set may sometimes be obtained in the center of the channel of a narrow stream, on shallow rapids. Two things must be carefully noted here. First, that the otter does not travel on the shore at this point, and, secondly, that a point be selected for the trap where the channel is narrow and the water shallow.

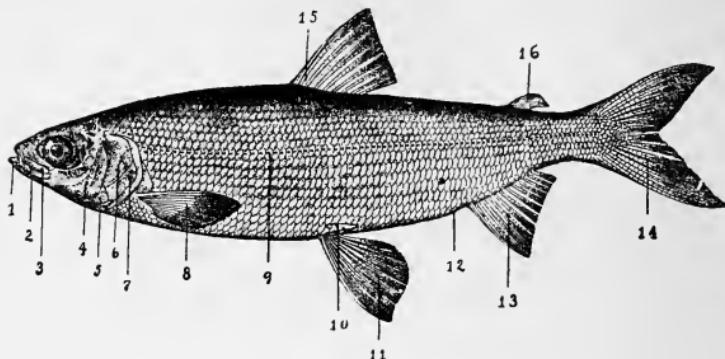
575. Land Set.—This is much more difficult, yet if done properly is much the better set of the two. At some certain point on the otter's line of travel on the land, and commonly near the top of a bank down which he has a regular slide, is a spot selected by this strange animal for voiding excrement. He will travel for long distances to reach this spot rather than do so at any other place. Sometimes it is deposited all in one heap, and sometimes scattered over a space a rod or so in diameter. If it is not in one pile, the trapper, making as few steps as possible, must gather the dried accumulations and

deposit them on the greatest heap already formed, and having a perfectly clean trap ready (some trappers prefer having the trap well-smoked with the smoke of dried grass), together with the stake for fastening, proceed to dig a hole in the ground with the blade of the hatchet, in front of the heap of excrement, and about a foot distant from the edge of it, on the side next to the otter's trail, using the fingers as little as possible to avoid leaving scent. Dig just deep and wide enough to hold the trap, and use all possible skill in covering the trap, to have just as little matter covering it as may be and have it well hidden, in order that the trap jaws be not hindered from gripping firmly when sprung, and to leave the general appearance of the ground the same as before the trap was set. Be careful also to set the trap so that the jaws lie open on each side of the otter's line of approach. Now drive the stake below the surface of the ground and cover it and the chain carefully. The job is now complete, and the trapper—who of course will have been careful not to blow his nose or spit tobacco juice near the trap—walking carefully away, and on afterward coming to visit it once in two or three days will only approach near enough to see that the trap is all right, stands a very good chance to make the acquaintance of the sleek brown creature with the much coveted overcoat, provided his work has been well done.—“Uncle Fuller” in *Forest and Stream*.

576. Crawfish for Bait.—To preserve crawfish for bait in large numbers, pack in wet sawdust and salt, or brine. Scalding will discolor them. A little saltpetre added to the salt will improve the pickle.

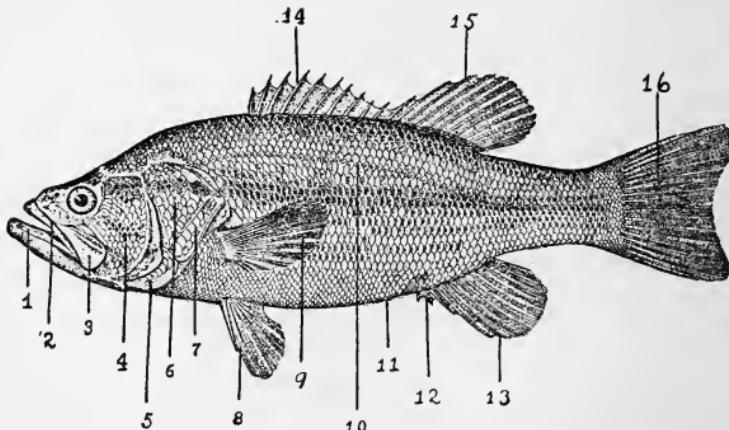
577. Trout Temperature.—Water for trout should not be above a temperature of 70°, tested by a thermometer at the bottom.

578. Parts of Fish.—Whitefish (*Coregonus albula*): 1, mandible; 2, maxilla; 3, supplemental maxillary bone;



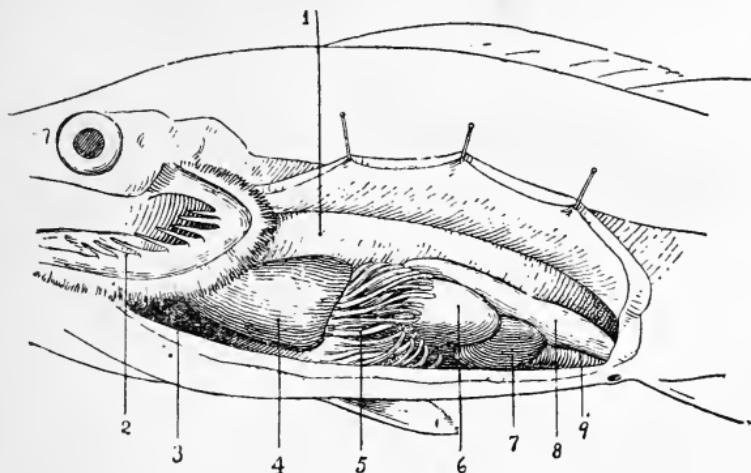
4, pre-operculum; 5, inter-operculum; 6, operculum; 7, sub-operculum; 8, pectoral; 9, lateral line; 10, ventral appendage; 11, ventral; 12, vent; 13, anal; 14, caudal; 15, dorsal; 16, adipose dorsal.

579. Parts of Fish.—Black bass (*Micropterus salmoides*):—1, mandible; 2, inter-maxilla; 3, maxilla; 4,



pre-operculum; 5, inter-operculum; 6, operculum; 7, sub-operculum; 8, ventral; 9, pectoral; 10, lateral line; 11, vent, 12, pre-anal spines; 13, anal; 14, spinous dorsal; 15, soft dorsal; 16, caudal.

580. Viscera of Black Bass.—1, air bladder; 2,



gill-rakers; 3, heart; 4, liver; 5, pyloric coeca; 6, stomach; 7, spleen; 8, spermary; 9, intestine.

581. **Black Bass, Large-mouth and Small-Mouth.**—The large-mouth (*Micropterus salmoides*) is distinguished from the small-mouth (*M. dolomieu*) thus: In the large-mouth the upper jaw or maxilla (see 579) extends far behind the eye; in the small-mouth the maxilla extends to a point below the eye. The large-mouth has from sixty-five to seventy rows of scales between the gill-openings and the base of the tail; the small-mouth seventy-two or more; the large-mouth about ten oblique rows on the cheek, the small-mouth seventeen; in the large-mouth are seven and a half to eight rows between the lateral line and the dorsal, in the small-mouth eleven.

582. **Smelt Fishing.**—Smelts are fished for with the lightest of tackle, say with Nos. 10, 9, 8 or 7 Limerick, or 20, 19 or 18 Kinsey hooks, of which three or four should be used at short distances apart on the leader. Such tackle as would be used for perch fishing, only with more hooks. Clam make good bait, or a piece of liver.

583. Minnow Life Preserver.—An ingenious contrivance for aerating the minnow bucket consists of a rubber tube with a bulb. The end of the tube is inser ed



in the water and the pressure of the bulb forces in the air, which means life to the bait, and removes the necessity of frequently changing the water.

584. Flies and Insects.—Do not throw dishwater nor garbage near the tent; they will attract flies, ants and other insects.

585. Cold Tea or Cold Water can be kept cold by wrapping the jug or bottle in flannel kept wet with water and exposing to sun and wind to promote evaporation.

586. Camp Cooking.—Stale bread or crackers fried in butter or pork grease make a good dish. Cut up cold potatoes, put into the pan with milk or butter, add a little water and warm through.

587. Keeping Game.—After drawing feathered game hang it up by the head. Meat may be kept fresh for some days in the hottest weather by immersing in a jar of water and covering the surface with oil, or melted butter or pork fat.

588. Game in Camp.—The best thing to do with meat when flies are troublesome is to raise it on a pole as high above the ground as may be convenient. On the top of a pole from 25 to 30 feet in height flies will seldom find meat, and it is practically secure from their attacks.

589. Game Should Not Be Packed until it is thoroughly cooled.

590. Do Not Camp under dead trees; they may be blown down on you.

591 Match Safe.—Into an unprimed 10-gauge metal shell slip an unprimed 12-gauge shell.

592. To Cure Raw Hides.—This recipe is for sheep and buckskins, and may answer for caribou and beef skin, taking more time: Take two parts of saltpetre and one of alum; pulverize them well together; spread the skin carefully, fur side down, before it has got dried; apply the mixtures evenly, being careful to touch every part in sufficient quantity to thoroughly wet the surface after it dissolves; double the flesh side and roll it up closely; put it in a cool place, out of the way of the frost, and let it remain three or four days or more, according to thickness; then unroll, and when it gets nearly dry, with a dull knife remove the fat that may adhere in spots, and a little rubbing makes it pliable and fit for use.

593. Mosquito Preventive.—Take of tar—just the plain, old-fashioned tar of our fathers—half a pint; lard—vaseline is better—half a pint; oil of pennyroyal, half an ounce; creosote, three drops; mix with heat, and can or bottle for future use.—“*Kingfisher*,” in *Forest and Stream*.

594. Waterproof Cape.—Take two yards of heavy drilling, 28 or 30 inches wide, cut into two pieces, each one yard long, sew together at the selvage, making one piece, 50 to 60 inches wide; cut in circular form, making

the cape long enough to come well down below the waist and over the arms to the ends of the coat or shirt sleeves; leave out a little over one-third of the circle for the open front, cut to fit the neck closely, put in buttonholes and buttons down the front, oil heavily with boiled linseed oil with a little turpentine and Japan dryer in it. The neck may have three or four gores in it to insure a snugger fit, but they are not necessary. Make up the goods with the twilled side out. Total cost about 25 cents.—*F. R. Webb, in Forest and Stream.*

595. Fleas and Lice on Dogs.—Almost all of the various remedies that are recommended for their extermination will have the desired effect providing they are promptly applied. None of them will accomplish the purpose unless so applied. The louse is very prolific and matures at a very early age, and none of the various remedies will destroy the vitality of the egg, no matter how thorough has been the war of extermination. It is necessary, in order to make a sure job of it, that the work be thoroughly done in the first place, and thoroughly repeated at least once a week. Persian insect powder, when rightly used, answers the purpose very well, and is perhaps the most cleanly and least troublesome method in cold weather, but as the powder only stupifies and does not kill the insect, it is necessary to follow its application with the fine comb, of course destroying by fire every captive. To apply the powder, place the animal upon a large sheet of strong paper, and with an insect gun or common pepper box thoroughly dust the powder into every portion of his coat, following this with a vigorous shampooing until every insect receives its share. Most of them will at once vacate the premises and fall upon the paper. Those that remain must be found with the comb and all thrown into the fire. This should be repeated every three or four days until the parasites all disappear.

596. Quassia Water.—An infusion of quassia

wood will also destroy lice. Take two or three ounces of the chips and tie them up in a muslin bag. Suspend them in a pail of water, stirring occasionally. After two hours the infusion is ready for use. Apply it freely with plenty of soap and rinse off with clear water. Strong tobacco water, applied in the same manner, may be used with good results, although it is apt to make the animal sick. Whale oil, freely used; is also sure death to lice. This should be thoroughly washed out of the coat a few minutes after using on account of cleanliness. Mercurial preparations of all kinds are never to be used for this purpose, as bad results are always sure to follow. Neither can kerosene be recommended, for the same reason.

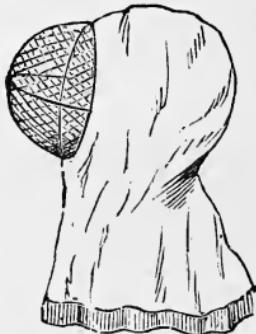
597. Care of Kennels.—It is absolutely necessary that the kennel and bedding be attended to or all of your labor will be in vain. A good coat of whitewash put on hot, taking care to fill up all the cracks, will render your kennel almost insect proof. The bedding should be changed often. Cedar shavings make the best bed, although those of pine will do very well. The bedding of dogs which sleep in the house should be frequently scalded out in strong soapsuds, and after rinsing in clean water, hung in the sun until perfectly dry. By closely observing the above rules one can soon rid his kennel of both fleas and lice.

598. Preserving Ferns.—To dry fern leaves so as to preserve their color, take dry sand, place leaves thereon and sift a layer of an inch or so of sand on the leaves, being sure to arrange the leaves flat and neatly. Flowers can also be preserved this way. Let the whole remain till the leaves are dry. Keep sand in moderately warm room.

599. Preserving Autumn Leaves.—Place the leaves between sheets of blotting paper, taking care they do not touch each other. Then at intervals of

about six of the papers lay either a folded newspaper or a piece of card board. When all the leaves are arranged place the papers containing them upon a smooth board with another board on top, and on that a heavy weight. Let them remain in a warm room for a day, then replace them in dry, fresh papers and keep this up for four or five days.

600. A Shanty-Made Insect Hood.—We took a spare rubber blanket and cut out a cap in shape similar to the soldier's havelock, with oval opening large enough to allow plenty of room for the face, and with cape about eight inches long. Then we took a witchhopple stick, bent it around and sewed it in the rim of the opening. We should have used wire if we could have obtained it,



but did not have time to run down to the store for it, as it was about sixty miles from us. Then with some hoop-skirt wire, which some unfortunate female had left in our shanty, we bowed out a piece from the forehead to the chin, and then transversely, sewing it firmly in its place; then over this a covering of mull or netting, and your cap is complete. This is the only thing that I have found to keep off insects and insure a good night's sleep. You can lie in any position, it is not uncomfortable, and serves also as a night cap. The cape should be securely tucked under the coat collar, and tied snugly

around the throat. By using a very fine veil over the opening of your cap, the punkies can be euchred in the same way. I think oil silk would be better than rubber cloth. We all tried this last summer, and I used my old one this summer, and money would not buy it if I could not get another one.—*Correspondence Forest and Stream.*

601. Ornithologists' Terms.—*Auriculars*, ear coverts, soft feathers that cover the ears; *bastard wing*, three or five-feathered, resembling the quills of the true wing, placed on a small bone rising from the wrist joint of the wing; *lesser coverts*, feathers found in successive rows on the wings—those on the inside are termed *under coverts*; *greater coverts*, large wing feathers lying under the lesser coverts; *primaries*, large quill feathers growing from below the wrist joint; *secondaries* or *second quill feathers* spring from second bone of the wing, appearing when the wing is extended like a continuation of the primaries; *tertiaries* or *third quill feathers* also rise from the second bone, but much nearer the elbow joint; *scapulars* or *shoulder feathers*, soft, downy feathers that cover the shoulder bones; *rump feathers* and *upper tail coverts*, continuations of the covering of the back; *vent feathers* and *under tail coverts*, feathers extending from the arms to the tail underneath; *loral space*, space between the bill and eye; *frons*, the forehead; *occiput*, hind part of head; *flexure*, bend of the wings; *tarsi*, shanks of the legs; *tibia*, thigh; *upper and lower mandibles* or *superior and inferior maxillæ*, the upper and lower bills; *iris (irides)*, colored circle surrounding pupil of the eye; *mentum*, the chin; *guttur*, the throat; *collum*, the neck; *pectus*, the breast.

602. Moulting of Birds.—Birds moult or shed their entire plumage once or twice a year. The moulting is very gradual, and few birds are ever so bare of plumage as to prevent their flying. Some birds moult in late summer, some in early fall and some in early spring. Summer and fall moulting is always the most complete.

Birds which go north to breed receive their fresh plumage immediately after the period of incubation has passed.

603. The Scow.—The scow (Fig. 1), may be built in a few hours and at an expense of two or three dollars only. A few common boards of pine, spruce, or almost any wood, can readily be obtained, 13 feet long, 10 inches wide and 1 inch thick. To construct a boat to carry two or three persons, four or five boards will be necessary. Two of these should be selected and a length of 10 feet sawn from each. The edges of these pieces are now planed or

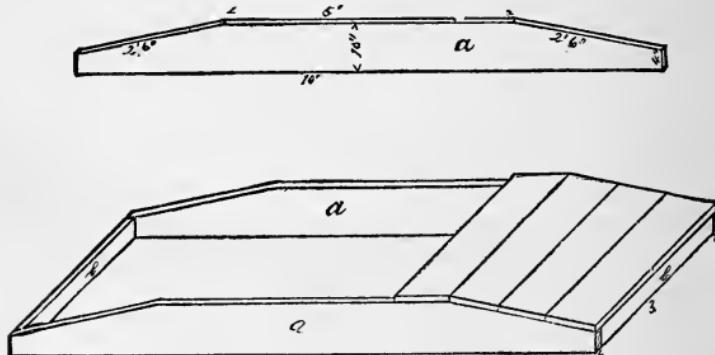


FIG. 1—SCOW.

“jointed” up straight and square to the sides, the latter being either planed or left rough. These two side pieces (*a*) are laid one on the other, and two or three small rails driven through them to hold them temporarily together, and the outline of the side is now marked on the upper one. The upper edge of the boat will be straight, the bottom will be straight for 5 feet amidships, and at each end for 2 feet 6 inches will slant upward until the end pieces of the boat (*b b*) are but 4 inches deep. The two boards are now sawn to shape and planed square on the ends and the slanting portions of the bottom, then they may be taken apart. Each end piece will be 3 feet long,

or longer if a wider boat is required, and $4\frac{1}{2}$ inches wide in the rough. The upper edges are planed up, and the sides are each nailed to the ends, using eight-penny nails, or ten-penny if the stuff is over $\frac{1}{4}$ inch thick. The frame is now turned bottom up, the two end pieces are planed on their bottom edges to correspond with the bevel of the bottom, then a sufficient number of pieces to cover the bottom are sawn off the remaining boards. In this case they will each be 3 feet 2 inches long. Their edges are carefully "jointed up" straight and square, and they are nailed in place across the bottom. When all are nailed on, the ends may be planed down even with the sides of the boat. To stiffen the bottom a strip 5 inches wide and $\frac{3}{4}$ to 1 inch thick (see *i*, Fig. 2) is laid down the center of the bottom inside and nailed with wrought or clinch nails to each plank, the nails being driven through and their points clinched or turned in, using a hammer and an iron set. About 2 feet at each end will be covered with a deck, as at *h*, Fig. 2. One seat will be put in for rowing, being supported on two cleats, one nailed to each side. Iron rowlocks (cost seventy-five cents per pair) are better than wooden ones, but if they are not to be had, the latter can be made of oak. A cleat of oak $1\frac{1}{2}$ inches thick, 2 inches deep and 9 inches long is then screwed along the inside of the gunwale. In each cleat two mortises are cut, $1\frac{1}{2}$ inches long, $\frac{1}{2}$ inch wide and $3\frac{1}{4}$ inches apart. The rowlocks are each 7 inches long, $\frac{1}{2}$ inch thick, 2 inches wide above the cleat and $1\frac{1}{2}$ inches wide in the mortises, projecting 4 inches above the gunwale and 3 inches below. If all the joints are neatly made, the boat should be tight after being in the water a short time; but it is always best to paint or tar the entire boat, inside and out, preserving the wood and lessening the chance of leakage. In no case should caulking be needed in a new boat. If the builder desires, each edge can be painted as the board is put in place, which will still further prevent any leakage.

604. The Punt.—The punt, as it is commonly called (Fig. 2), is a scow of rather better design than the one described above, but the operations of building are similar. Such a boat may be 14 to 16 feet long, 4 feet beam at gunwale, 3 feet 4 inches at bottom, and the sides 14 inches deep. The sides (*ff*) will each be a little longer than the length of the completed boat, 14 inches wide and $\frac{1}{4}$ inch thick. They should be free from knots and sap wood, and as nearly alike as possible, so as to bend

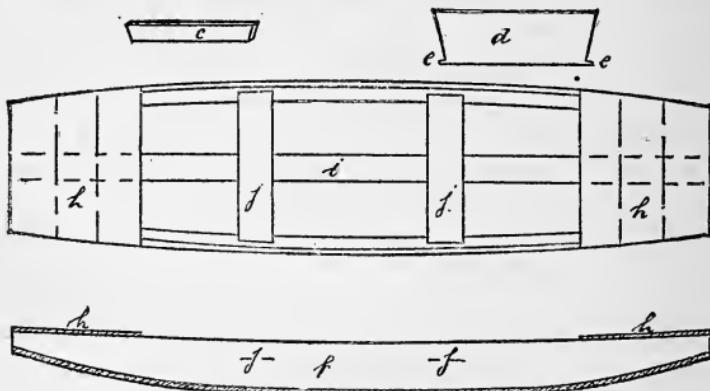


FIG. 2—PUNT.

equally. One is laid on two benches, the outline of the boat is marked out as shown, the ends sweeping upward in easy curves, and it is sawn and planed to shape. It is then laid on the second board, the two are lightly nailed together, and the latter planed to match, a center line being marked on both while nailed together. The two end pieces (*cc*) are next sawn out of 1 inch oak or ash, the ends being beveled, as the bottom of the boat throughout will be narrower than the top. Next a piece (*d*) 14 to 16 inches wide and 4 feet long is sawn off and the ends beveled, making it 4 feet long on the upper edge and 3 feet 4 inches near the lower. The two small projections (*ee*) are left, to aid in setting the side correctly. This board or mould is placed on edge, one side board is laid

in place against it at the center mark, and a few nails are driven through the side board into the end of the piece. Now the other side is fitted in the same manner. The three pieces resting on a level floor, the corresponding ends of the side pieces are drawn together with ropes until the end pieces will just fit between, then the sides are nailed or screwed to the ends. The best way to do this is to bore the holes and fit each side in turn to its corresponding end piece, putting in the screws before the sides are nailed to the mould (the pieces after fitting being taken apart); then when the ends are finally in place there is no trouble in holding and adjusting them, the screws being reinserted in the holes already bored. When sides and ends are well fastened together, both of the frames should have the same degree of curve, and the entire frame should be true and symmetrical. The lower edges of the sides having been planed square, now require to be beveled slightly, on account of the outward flare of the sides. To do this a piece of board, one of those cut for the bottom, is laid across and used as a guide, the outer corner of each edge, both of sides and ends, being planed off until the board lies flat across all the edges. The bottom boards are now cut to length and nailed in place, the edges of each being very carefully planed up to fit its neighbors. When the bottom is on, the ends are planed off even with the side of the boat, it is turned over and a strip (*i*) 5 inches wide is nailed down the middle of the bottom, as in the previous boat. This strip will be 1 inch thick at its center, but toward the ends it may diminish to $\frac{1}{2}$ inch, so as to bend more easily to the curve of the bottom. When it is in, the ends are decked over for 2 or 3 feet, as at *h h*. Two thwart or seats (*j j*) will be put in, each 9 inches wide and 1 inch thick. They should be placed about 7 inches below the gunwale, and each end will rest on a short piece nailed to the side of the boat, long enough to reach from the bottom to the wider side of the seat. The seats should be secured well to the sides,

as they serve to stiffen the boat. A gunwale strip is usually run around the outer edge. It may be of oak $\frac{1}{4}$ inch wide and $1\frac{1}{2}$ inches thick, screwed to the side pieces. Rowlocks and stretchers complete the boat. It will, however, be easier to row straight if a skag be added to the after end. A stern post of oak, $1 \times 1\frac{1}{2}$ inches, is nailed down the center of the end, and in the angle between it and the bottom is fitted a piece of 1-inch board (*o*, Fig. 3) nailed to it and the bottom. On the stern post a rudder may be hung if desired.

605. The Skiff.—In this boat the after end is similar to the previous one, but the bow is very different, resembling more a round-bottomed boat. The sideboards are marked and cut as in the former boat, but at the fore end they are not cut up at all, but are sawn off at a slight bevel to fit the forward rake of the stem (*k l* shows the sideboard in the rough, with the side marked out). The gunwale will have a slight sheer, part of it being due to the bending of the sideboards, but to increase it the upper edges are made a little hollow, their concavity being from 1 to 2 inches, according to the sheer desired. A middle mould is cut out similar to *d*, and also a stern piece, the latter of 1 inch oak. It is fitted and screwed to each sideboard in turn, then it is taken off, the sideboards are nailed to the mould along the lines *A B*, and the sternboard is replaced and screwed fast. Now the two sides are drawn together with a rope at their fore-ends until they nearly or quite meet, as at *t*, and a piece of oak of triangular form (*r*) is cut to fit in the angle between them, and they are screwed fast to it. The bend of the sides will cause the bottom of the boat to have considerable rocker, usually much more than is desirable. To avoid this, when the frame is thus far completed, the bottom edges of both sideboards are planed down from *m* to *n*, until the bottom is straight for some distance amidships. This can best be determined by setting the frame, top up-

ward, on a level floor. When the edges are planed off equally they must be beveled, as in the preceding boat, the floor is nailed on, the middle piece is put in and

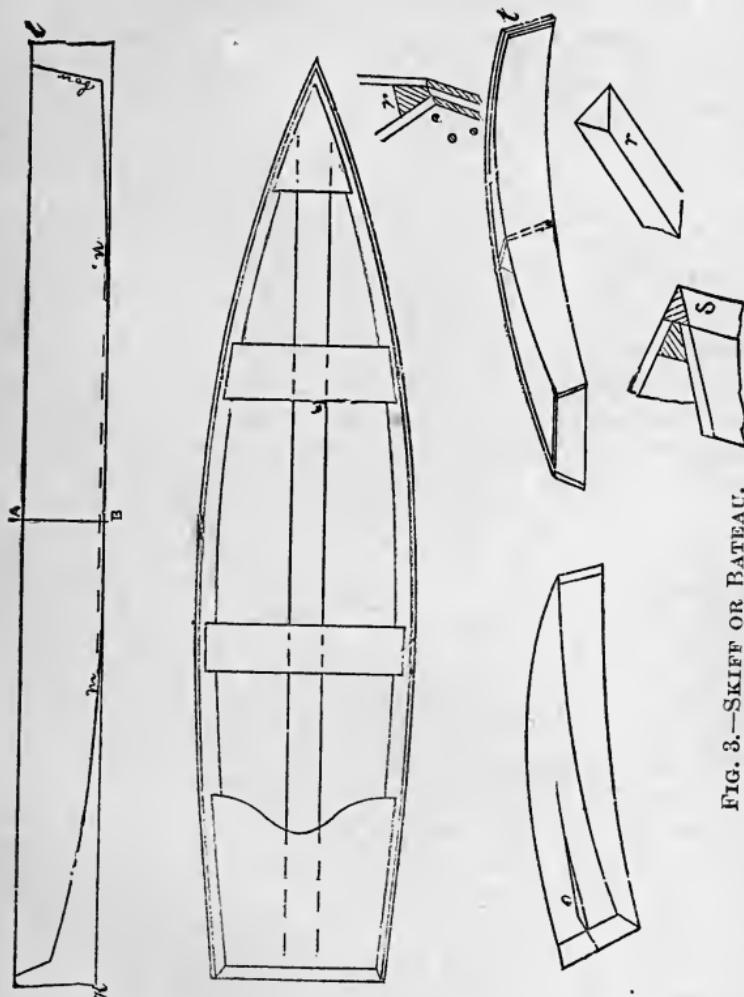
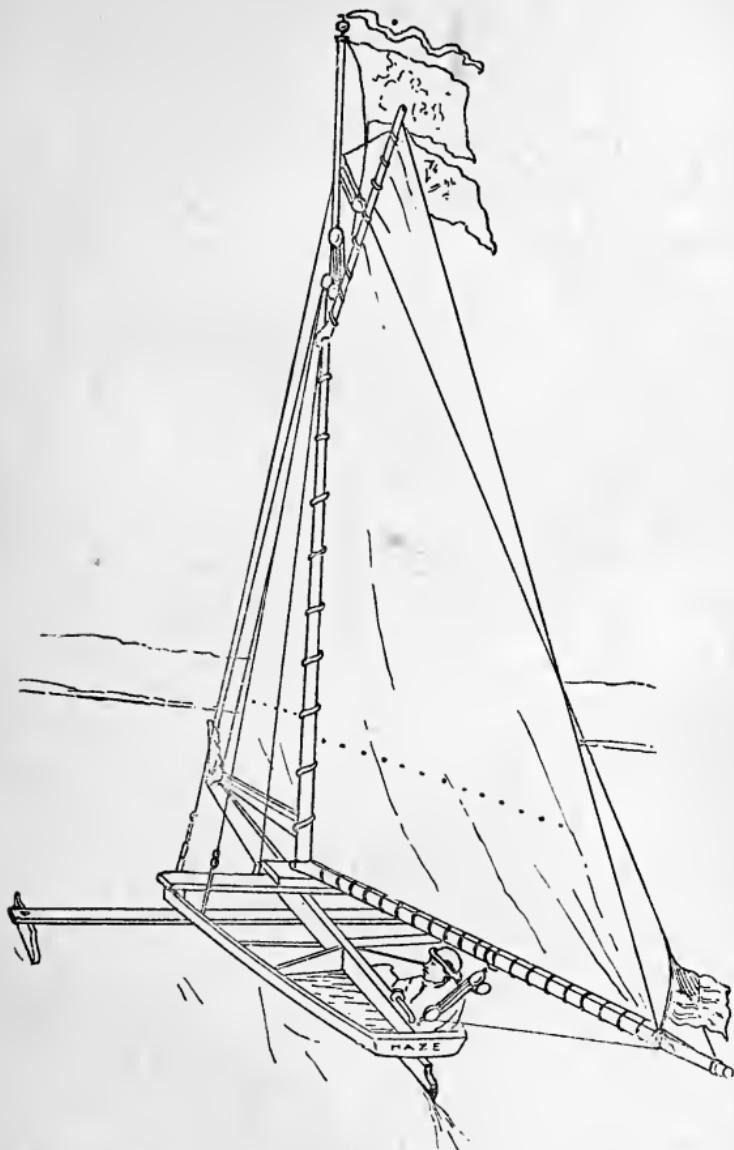


FIG. 3.—SKIFF OR BATEAU.

nailed down, and the thwarts put in. Both in bow and stern there will also be seats at about 3 inches below gunwale and of the shape shown. To complete the bow, the ends of the sideboards are planed off, and another trian-

gular piece of oak (*s*) is sawn out and nailed against the ends and the piece *r*, as shown, making a sharp bow. A scag (*o*) is also added, wale strips are put on, and the boat is ready for painting. Such a boat may have a center-board, and may also be fitted with sails in the same manner as an ordinary round-bottomed boat.

606. To Build an Ice Yacht.—The body, or boat proper, is made up of three principal parts—the keel or center timber, and two side timbers. The keel is 24 feet 6 inches long, 3 inches wide, and 9 inches deep. The two side timbers are each $2\frac{1}{2}$ inches wide and 4 inches deep. They are joined at the stern to a semi-circle of 15 inches radius, and at the mast by means of a curved plank 12 inches wide, 3 inches deep, and 7 feet 4 inches long, which is bolted to them. The runner plank, to which the two forward runners are bolted, and which is bolted to the under side of the side timbers and running under the keel, which projects about an inch below the side timbers. The runners are three in number, two forward and one aft (called the rudder), are made of 2-inch plank, and have steel shoes bolted to them by means of bolts tapped into the shoe and running through the wood, having their heads countersunk therein so as to be flush. The shoes are fastened by $5\frac{1}{2}$ -inch bolts tapped into them; they are ground on the running edge to an angle of 90° , and are $1\frac{1}{4}$ inches deep. The after runner, or rudder, is smaller than the forward ones, and is fastened to a rudder post, which passes through the keel and terminates in a tiller, 2 feet 8 inches long, by which the boat is steered. The body is planked on the under side with inch boards for a distance of about 7 feet from the after end. The mast is 20 feet high, 5 inches in diameter at the foot and $3\frac{1}{2}$ inches at the top, and has a topmast fixed into the top 3 feet long, 2 inches in diameter at the large and 1 inch at the small end. The bowsprit is 16 feet long, 6 inches deep at the widest part and $3\frac{1}{2}$ at the ends, and is 3 inches

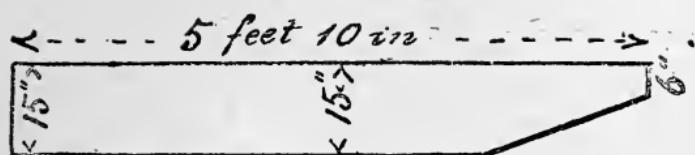


wide on the bottom, beveling to 2 inches on the top. It is fastened to the keel by means of an iron band three quarters of an inch wide, and also by a bolt running

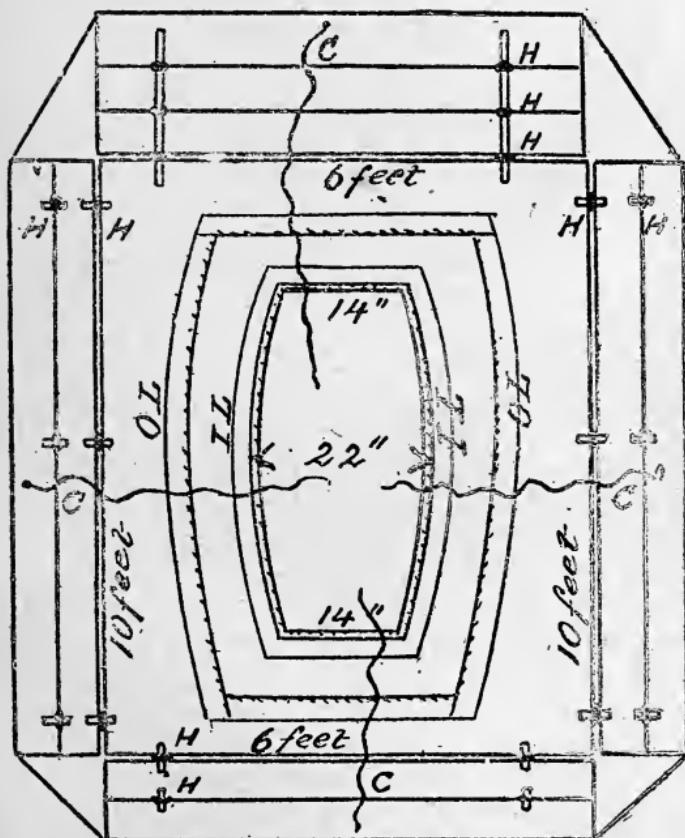
through both. The boom is 29 feet long, $4\frac{1}{2}$ inches in diameter in the center, and $2\frac{1}{2}$ inches at the ends. It is fastened aft of the mast by means of an eye and a staple. The jibboom is 15 feet 3 inches long, $2\frac{1}{2}$ inches in diameter at the center, and 2 inches at the ends, and is fastened to the forward end of the bowsprit. The gaff is 8 feet 9 inches long, 2 inches in diameter, and has the jaws made to an angle, so that they set square across the mast. The sails are two in number, the mainsail and the jib. The mainsail has the following dimensions: Hoist, 14 feet 6 inches; foot, 28 feet; head, 8 feet; leach, 28 feet; the lift of the mainsail at the end of the boom is 1 foot 6 inches. The dimensions of the jib are as follows: Hoist, 15 feet; foot, $14\frac{1}{2}$ feet; leach 22 feet; and it has a lift of 1 foot. The rigging is of half-inch round iron and wire rope.—*Scientific American.*

607. Sinkboat.—The dimensions, material, etc., to be used in constructing a sinkboat are as follows: The box in platform should be made of $\frac{3}{4}$ -inch best white pine; or still better, white cedar, if to be had. The ends of box should be of white oak, $1\frac{1}{2}$ inches thick. The box should be 5 feet 10 inches long, in the clear (this will accommodate any man not over 6 feet in height, as both his knees and neck are bent in lying in the position to shoot) 15 inches deep in clear and 22 inches wide, sides straight perpendicularly, but sprung together at ends to 14 inches at head and foot. The simplest way is to make the box the same depth all over, but it is by no means the best way. The foot should be of full depth, viz., 15 inches. Cut away the head of box to, say, 6 inches, because the shooter, in lying down, has to have his eyes above the level of the box in order to watch the flight of the fowl, so that very little depth is required at the head. The box should be put together in the very best manner, as on its being perfectly tight depends the comfort of the shooter. Make a $\frac{1}{2}$ -inch drain board to be in bottom of box, and

Side View



Plan



the sink is completed so far as the box is concerned. Around the box is built the "platform," as follows: Have two oak carlings cut out 6 feet long, $1\frac{1}{2}$ inches thick and $2\frac{1}{2}$ inches wide in the middle, tapering off to about $1\frac{1}{2}$ inches at ends with 1 inch spring or $1\frac{1}{2}$ at most. Bolt these securely to ends of box, 1 inch below the top. You are now ready to put on the platform or deck. This should be of $\frac{1}{2}$ -inch white pine or cedar, 6 feet wide and 10 feet long, the seams of the deck to be well fitted together and especially made tight where it fits round the box, which will project above the deck $\frac{1}{2}$ inch. On each end of deck, nail on a batten of $\frac{1}{2}$ -inch strip, 3 inches wide, on under side of deck. At the head of platform is the head wing, which should be made of three $3\frac{1}{2}$ inch pine or cedar boards, each 12 inches wide, and fastened together by strong iron straps, with hinges at each board, and also where the wing joins the platform. These hinges should be so arranged as to give the board composing the wing free play to swing down at right angle with platform, and to fold back on top of same, tack loosely so as not to interfere with swing of wing, strips of heavy drill or duck (of color as nearly resembling as possible the water the boat is to be used in) over each crack between wing board and between inner wing board and platform. This completes the head wing. Side wings to be of $\frac{1}{2}$ -inch pine or cedar boards, two on each side, each board 8 or 10 inches wide and connected together and with platform by three heavy sole-leather hinges in such a manner as to give free play with platform with the strips of drill or duck nailed over the head wing. In addition to the battens nailed under the platform there should be one on each side of box amidships on under side of platform, which should be braced to box by an iron ell. The ends of all these battens should project beyond the sides of the platform about an inch, so that the side wings will have something to rest on, as the leather hinges must be long enough to let them fold

over the foot wing when the boat is folded up. The foot wing should be made like the side wings, extending across the foot of box, or a single board 14 to 16 inches wide can be used at foot. Connecting the wings at each of the four corners are triangular pieces of lead-colored duck, or heavy drill, tacked to the wings and having a stout cord sewed to their outer edges; on cord use small corks to keep the corner pieces on top of the water as much as possible. The leads consist of two rows of sheet lead from 4 to 5 inches wide, the inner row to be tacked round the edge of box along the inner edge of the lead in such a manner that the outer edge can be bent up to keep the sea out. The outer row of lead is nailed round the platform half way between the box and the edge of the platform all round. Paint box, platform and wings as near the color of the water in which the box is to be used as possible. The sink is to be moored by two anchors, one at the head and one at the foot. For head anchor two holes should be bored at head carling, about 15 inches from each end, and a rope knotted through these holes making a "bridle" about 10 feet long. The anchor rope should be made fast to the bight of this bridle. This lets the head of box ride free in a sea. For stern anchor bore a hole in the platform near the edge at foot and let the anchor rope pass through this. This enables the shooter to trip his stern anchor (which should be a light one) in case of a sudden shift of wind so that the box will swing head in. At Havre de Grace they use a light frame for side and foot wings, with drill or tickings stretched over them. These platforms are generally larger also, the usual dimensions there being 12x7 feet, but the board wings are better than the canvas or drill, and the 6x10 platforms quite large enough. In the above sinkboat about 200 pounds of weight in addition to the man will have to be used. Have iron decoys cast, each weighing from 25 to 30 pounds. These are set in the platform with wooden de-

coys of about one-third the usual thickness. The bodies should not be more than 2 inches high and flat on the bottom. Use also light wooden decoys on wings with a "stool" of about 200.—"Sinkboat" in *Forest and Stream*.

608. Sneak Box or Barnegat Duck Boat.—Length, 12 feet; width midships, 4 feet; width of stern, 2 feet 9 inches; depth of stern, 7 inches. Sprung timbers all of one pattern, $\frac{9}{16} \times \frac{13}{16}$ inch; distance apart, 8 inches; deck timbers natural bend, 1 inch $\times \frac{7}{8}$ inch. Cock-

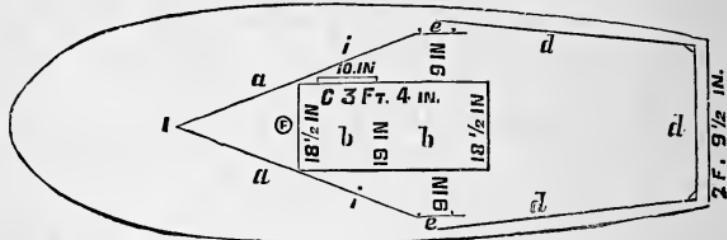


FIG. 4.



a, a—apron. *1, 1, 1* shows where it is nailed to deck. *b, b*—Cockpit. *c*—Trunk. *d, d*, *d*—Stool rack. *e, e*—Rowlocks. Fig. 4 shows rowlocks.

pit, inside measurement, length 3 feet 4 inches, width at bow and stern, $18\frac{1}{2}$ inches, amidships 19 inches. Combing, height of inside at bow and stern, $2\frac{1}{4}$ inches, midships, 2 inches. From bottom of combing to top of ceil-

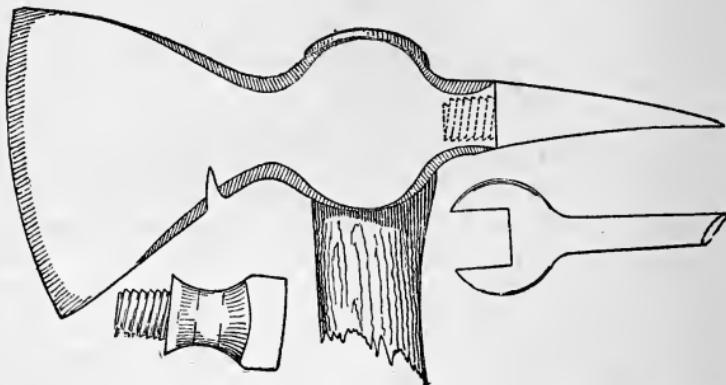
ing, 13 inches. Trunk on port side, set slanting to take a 15-inch board trunk placed alongside and abaft of forward corner of combing. Boards for boats, white cedar, $\frac{5}{8}$ inch thick, deck, narrow strips tongued and grooved. Rowlocks, height 6 inches, from coaming 9 inches, middle of to stern, 4 feet 7 inches, made to fold down inboard and to fasten up with a hook. Stool rack runs from rowlocks to stern, notched at ends into fastenings of rowlocks, also notched at corners and hooked together, rest against a cleat on deck outside, and are hooked to the deck inside. In a heavy sea the apron is used. It is held up by a stick from peak to combing. Thus rigged the boat has the reputation of being able to live as long as oars can be pulled. The apron is tacked to the deck about two-thirds its length. The wings are fastened to the top and bottom of the rowlocks. Mast hole $2\frac{5}{8}$ inches, 2 inches from coaming. Drop of sides from top of deck, $5\frac{1}{2}$ inches; deadrise, 8 inches. Over cockpit a hatch is placed. Everything connected with the boat is placed inside, gunners often leaving their guns, &c., locking the hatch fast. The boats sail well and covered with sedge are used to shoot from. With the hatch on, a person can be protected from rain, and with blankets, can be accommodated with a night's lodging.

609. A Knot is a nautical mile, or 6086.7ft.

610. Life Preservers.—There are numerous styles of boat cushions, made of hair, cork and other buoyant materials, which will answer as life preservers, and prudence dictates that some such provision should always be made for accidents on the water.

611. Hunting Hatchet.—The pike is square, hole the same, just back of the head, so as to fit the wrench. The head may be used in and around camp, putting up bunks, etc. And when you go on a hunt, by the proper application of the wrench, you can in a very short time

have a hatchet that will be of great use, should you wish to climb a tree, dig a hole, go prospecting or administer the *coup de grâce* to a badly wounded buck or bear.



The hatchet is not patented. Mine is made of finest steel, and in such a way that the head will not jam or stick.—*G. A. Scroggs in Forest and Stream.*

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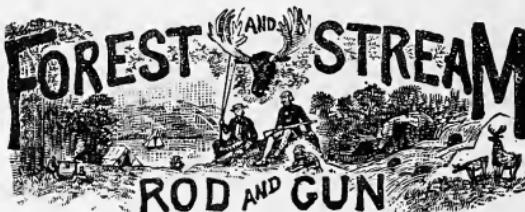
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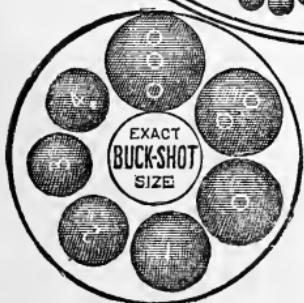
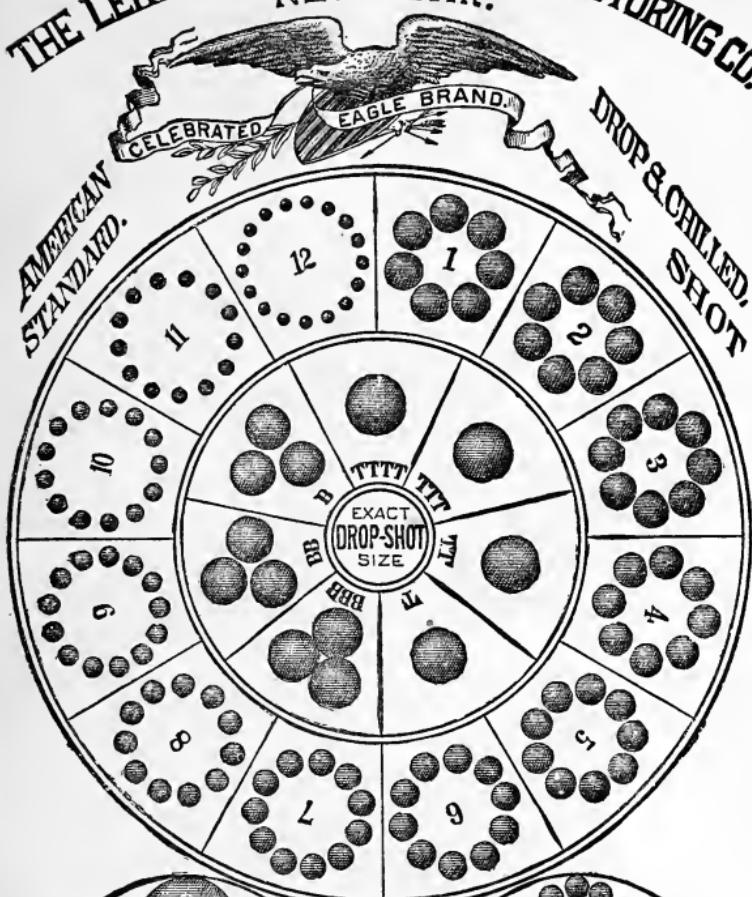
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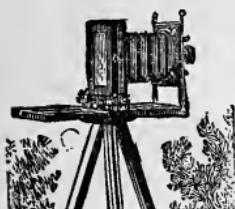
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